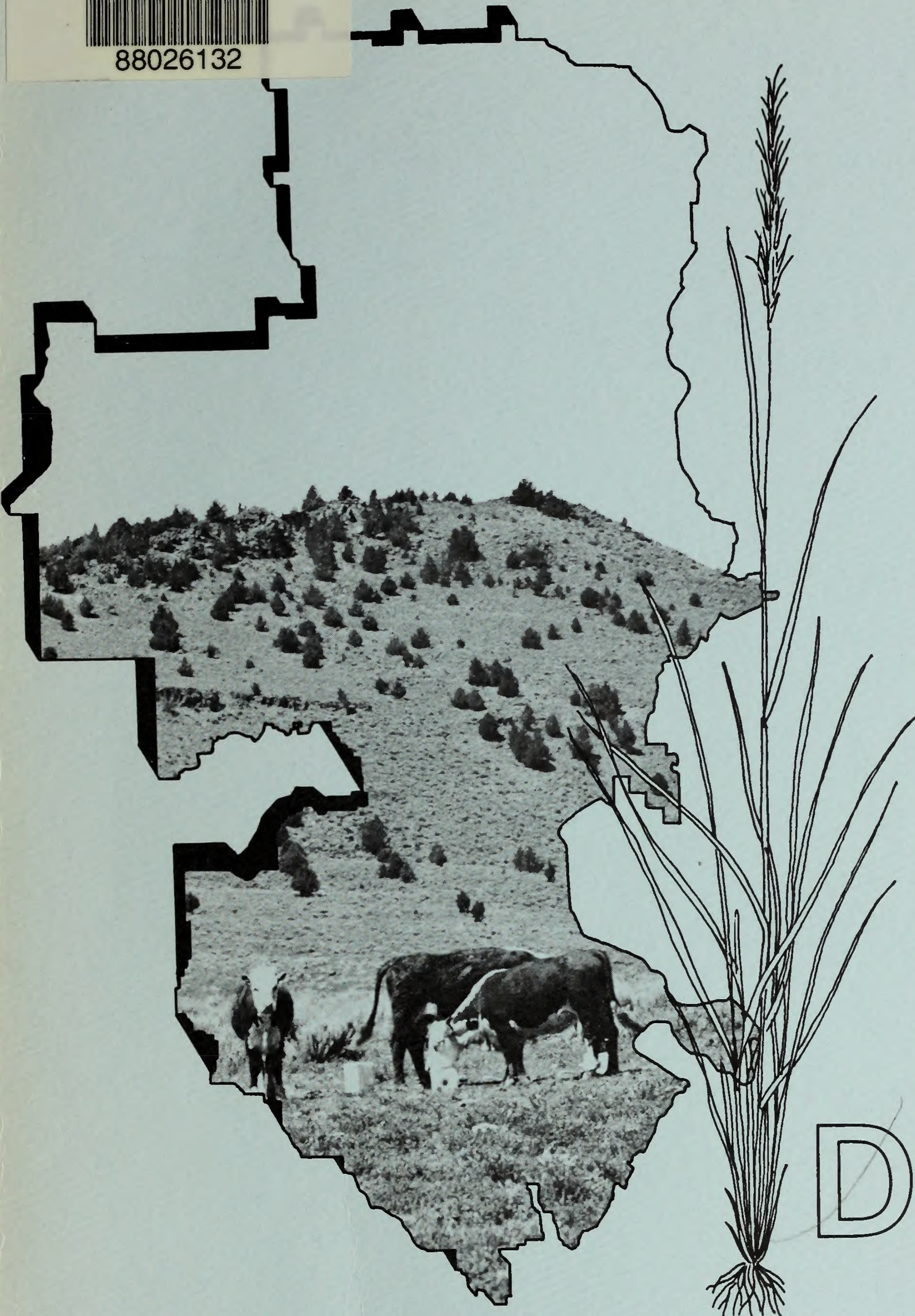

Drewsey

Draft Grazing Management Environmental Statement

Oregon State Office

DEPARTMENT OF THE INTERIOR

DRAFT

ENVIRONMENTAL STATEMENT

DREWSEY GRAZING MANAGEMENT PROGRAM

Prepared by

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR

State Director, Oregon State Office

SUMMARY

Draft (X) Final ( ) Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: Administrative (X) Legislative ( )

2. Description of the Action: The Bureau of Land Management proposes to continue a livestock grazing program for 677,709 acres of public land in the Drewsey ES area of the Burns District. The program consists of implementing 68 Allotment Management Plans (AMPs) on 81 allotments covering 636,444 acres of public land. Less intensive management is proposed for 43 allotments covering 18,553 acres; 1,680 acres would continue as a driveway; and 21,032 acres would continue with no livestock grazing. Implementation of the proposed action includes allocation of livestock forage to livestock, wild horses, wildlife, and watershed; establishment of grazing systems; and construction of range improvements consisting of reservoirs, springs, pipelines, wells, fences, cattle guards, seeding, and brush control.

3. Summary of Environmental Impacts: The proposed action would initially reduce livestock grazing by 8,442 AUMs. In the long term, forage production would increase from 79,167 AUMs to 101,773 AUMs. Erosion would be reduced significantly on 144,000 acres and would either be reduced slightly or not change on approximately 482,500 acres. Water quality would improve somewhat. Range condition would improve significantly on approximately 139,000 acres. No significant change is expected on the remaining 487,500 acres. The annual reproduction of waterfowl would increase from the existing 400 birds to 1,250 birds. Forage for big game animals would increase on 270,000 acres and decrease on 30,000 acres. Fish habitat would improve on 22 miles and remain poor on 10 miles. Hunter days are expected to increase. Construction of range improvements would cause short term disturbance of vegetation, soils, wild horses, and some wildlife species as well as minor adverse impacts on water quality. Range improvement projects would increase visual contrast. Potential for disturbance of unidentified cultural resources would continue in both the short term and long term. In the short term, 48 permittees would lose livestock forage, with 9 permittees losing at least 10 percent of their annual forage requirement.

4. Alternatives Considered:

(1) Eliminate Livestock Grazing
(2) Protect Sedimentary Soils and Optimize the Wild Horse Population
(3) Adjust Livestock Grazing Use
(4) Implement Only Cost-Effective AMPs
(5) Optimize Allocation of Forage to Livestock
(6) No Action

5. Comments Will Be Requested From:

(See list in Chapter 9)

6. Date Statement Made Available to EPA and the Public:

Draft Statement:
Final Statement:

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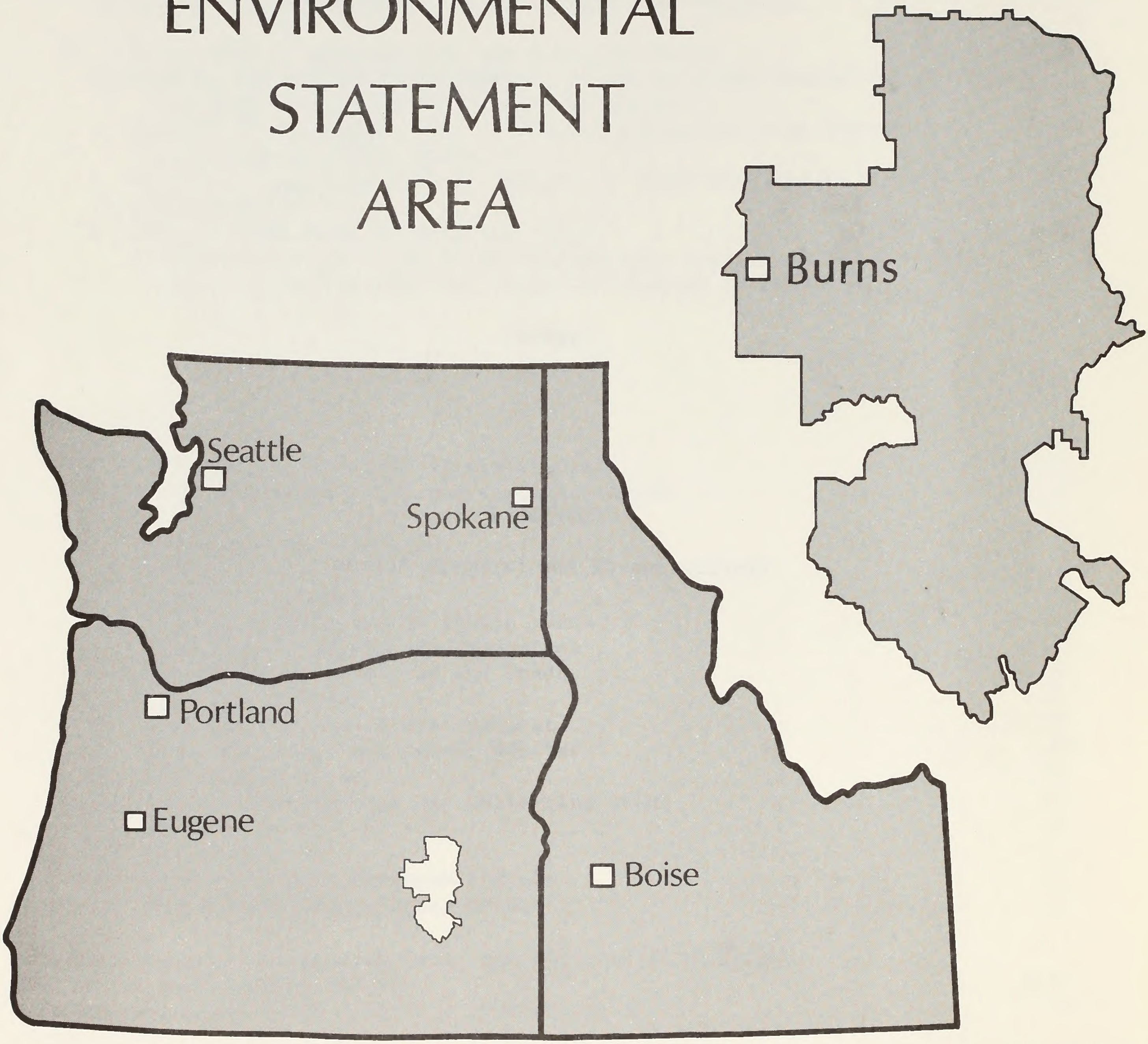
CHAPTER 1

Description of the Proposed Action

DREWSEY

ENVIRONMENTAL STATEMENT AREA



1. DESCRIPTION OF THE PROPOSED ACTION

The Bureau of Land Management (BLM) proposes to continue a livestock grazing program for the Drewsey Environmental Statement area (ES area), located in eastern Oregon near the town of Burns (Figure 1-1, folded map in the back).

The proposed action includes the following types of management:

- Allocation of forage to livestock, wildlife, wild horses and watershed.

- Continuation of intensive livestock management on 636,444 acres through implementation of allotment management plans (AMPs) which include grazing systems, construction of range improvement projects, and a program of studies and evaluation.

- Continuation of less intensive livestock grazing management on 18,553 acres.

- Continuation of authorized livestock trailing on 1,680 acres designated as a driveway.

- Continuation of unallotted status on 21,032 acres where no livestock grazing is presently authorized.

Within the Drewsey ES area are 1,344,235 acres consisting of 677,709 acres of land administered by BLM (hereafter referred to as public land); 6,823 acres of other Federal land; 33,939 acres of State land; and 625,764 acres of private land.

Table 1-1 shows the amounts of public land that would be affected by the proposal. As required by law (Taylor Grazing Act of 1934, Federal Land Policy and Management Act of 1976 [FLPMA], and Public Rangelands Improvements Act of 1978), BLM is responsible for management of grazing on the public lands.

1.1 OBJECTIVES

The objective of the proposed action is to manage the vegetation resource which provides the foundation for wildlife habitat, livestock and wild horse forage, and recreation. The proposed action is expected to meet this general objective by increasing the total annual forage production available for all uses from 79,167 animal unit months (AUMs) to 101,773 AUMs within 10 years after full implementation.

Long-term resource objectives, and methods to achieve them, are to:

- Improve vegetation resource through livestock management consisting of grazing systems and range improvements.

- Increase the total annual forage production, resulting in that portion allocated to livestock being increased from the initial 67,906 AUMs to 84,097 AUMs within 10 years after full implementation.

- Improve water quality and watershed condition by reducing the erosion condition class as measured by the soil surface factor (SSF). (See Table 3-6 and Section 3.2 Impacts on Soils for a discussion of erosion condition classes). Specific goals identified for reduction of SSF are:

  a. to reduce the SSF by 9 points or less on 482,529 acres;
  b. to reduce the SSF by 10 to 19 points on 99,639 acres; and
  c. to reduce the SSF by 20 points or more on 44,323 acres.

- Provide forage for wildlife by allocating 1,345 livestock AUMs initially and 2,647 AUMs after full implementation.

- Maintain a healthy population of wild horses in the five herd areas by providing sufficient forage for a maximum of 330 horses.

- Improve riparian habitat by fencing to exclude livestock grazing from 10.7 stream miles and 15 reservoirs and to restrict livestock grazing to 50 percent utilization on 11.2 stream miles.

Table 1-1

Summary of Livestock Portion of Proposed Action

Type of Management	Allotments	Acres Public Lands	Percent of Public Lands	1976 Authorized Use AUMs 1/	Proposed Initial Livestock AUMs 2/	Projected Livestock AUMs 10 Years After Full Implementation 2/
Intensive Management	81	636,444	93.9	74,079	65,781	81,972
Less Intensive Management	43	18,553	2.8	2,269	2,125	2,125
Continued Unallotted	3/	21,032	3.1	--	--	--
Continued Driveway	1	1,680	0.2	--	--	--
Total	125	677,709	100.0	76,348	67,906	84,097

1/ Actual use is the same as authorized use.
2/ See Table 1-2 for forage allocated to wildlife, wild horses, and watershed.
3/ Outside of established allotment boundaries.

Resource objectives would be achieved by managing livestock grazing. The basic management objective is to fully implement Allotment Management Plans (AMPs) for each allotment within 5 years. An AMP is considered fully implemented when all range improvement projects are completed and functional, thereby allowing the proposed grazing systems to be completely operable. Each AMP has specific management objectives for each relevent resource (Appendix A). Among the 68 AMPs, typical specific objectives are found in the River AMP which covers four allotments (5530, 5564, 5565, 5566). These specific objectives include:

Livestock - provide 5,857 AUMs of livestock forage.

Wild horses - provide yearlong forage for 50 wild horses.

Wildlife - provide winter forage for 350 antelope and 200 deer; manage for young willows along the Malheur River.

Watershed - reduce all SSFs (soil surface factor) below 35 within 15 years.

Vegetation and Soil Erosion - increase ground cover on big sagebrush sites (36,873 acres) to 60 percent or more; resulting in an upward trend of range condition within 5 years.

The general and specific management objectives cited above are based on multiple-use resource management concepts which provide for the demands of various resource uses and minimize the conflicts among those uses.

1.2 COMPONENTS OF THE PROPOSED ACTION

1.2.1 Forage Allocation

Initially, the proposal would allocate the present livestock forage production of 79,167 AUMs by reducing livestock grazing from the 1976 level of 76,348 AUMs to an initial level of 67,906 AUMs with the balance distributed as follows: wildlife, 1,345 AUMs; wild horses, 3,960 AUMs; and watershed protection 5,956 AUMs. The existing livestock grazing (1976) and proposed forage allocation by allotment are shown in Table 1-2.

The base year of 1976 was chosen because drought conditions during 1977 resulted in a considerable reduction in grazing use of the public lands. Ranchers reduced their total livestock numbers because of a shortage of livestock forage and hay. This reduced level of grazing has carried into the 1978 grazing season because livestock numbers have not been built back up to the pre-drought levels. Total livestock grazing use during 1977 (64,551 AUMs) and 1978 (65,753 AUMs) was lower than the proposed initial livestock forage allocation (67,906 AUMs). Therefore, 1976 was the last year when livestock use was typical. The existing environment described in Chapter 2 will be

that which existed in 1976. Impact analysis in Chapters 3 and 8 will also be compared to 1976 conditions.

Grazing in 10 allotments (77,304 acres) would be increased by a total of 1,440 AUMs. Grazing in 40 allotments (318,305 acres) would be reduced by a total of 9,882 AUMs for a net reduction of 8,422 AUMs. No initial adjustment is proposed for the remaining 76 allotments 259,388 acres. The increase of 1,440 AUMs in grazing is proposed because of successful establishment of crested wheatgrass seedings. This increased the forage production from approximately 25 acres per animal unit month (ac/AUM) to an average of 5 ac/AUM. The downward adjustments in livestock use are proposed to balance livestock grazing use with the present grazing capacity of 79,167 AUMs and the needs of other resources as shown in Table 1-2. These reductions are in addition to earlier cuts of 15,243 AUMs made during the preceding 10 years, when permittees′ preference was reduced to the 1976 authorized use level (Table 1-2).

In the long term (up to 10 years after full implementation), the proposed action is projected to produce a total annual increase of 22,606 AUMs of livestock forage. Of this increase, 16,191 AUMs would be allocated to livestock; 1,302 AUMs to wildlife; and 5,956 AUMs would be set aside for watershed protection. The allocation for wild horses would remain at the initial level of 3,960 AUMs. The projected allocations as shown in Table 1-2 reflect expected improvement in range condition and increased vegetative production, including that from seedings. In all cases projected forage allocations would not be made until studies and evaluations, described in Section 1.2.2.3, Monitoring and Management Adjustments, have shown the projected increases are available.

Both the initial and projected forage allocation comply with the Managment Framework Plan (MFP) recommendations and decisions as shown in Section 1.4, Interrelationships (Table 1-7).

The present forage carrying capacity of 79,167 AUMs was determined by using actual use, utilization, condition and trend studies, and comparision with adjacent areas having similar soils and vegetation. This information was obtained during the last 10 years. (See Appendix B5 for methodology).

1.2.2 Intensive Management

Implementation of Allotment Management Plans (AMPs) constitutes intensive management. Sixty-eight AMPs are proposed for implementation on 81 allotments covering 636,444 acres of the public lands in the Drewsey ES area (Figure 1-1, pocket). The AMPs were prepared in accordance with BLM Manual 4112.

An AMP is a livestock grazing management plan which prescribes the manner of livestock grazing use on a specific unit of rangeland and is designed to achieve multiple-use resource management objectives. AMPs include: (1) a system of grazing designed to meet the growth requirements of the key forage

Table 1-2
Proposed Action

Allotment Name and Number	Public Land (acres)	Other Ownership 1/ (acres)	Proposed Number of Pastures and Type of Grazing Use 2/	Proposed Maximum Season of Use	Preference 3/ (AUMs)	1976 Authorized Use (AUMs) 4/	Proposed Livestock Grazing Adjustment (AUMs)	Proposed Initial Forage Allocation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Carrying Capacity (AUMs)	Projected Forage Allocation 10 years after Full AMP Implementation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Projected Carrying Capacity (AUMs)
5001 Crane	1,280	--	L.I.M 5/	05/25-06/24	34	34	--	34	--	--	--	34	34	--	--	--	34
5002 Catterson	80	--	L.I.M.	04/01-08/31	9	9	--	9	--	--	--	9	9	--	--	--	9
5003 Malheur Slough	799	--	L.I.M	05/01-08/31	66	66	--	66	--	--	--	66	66	--	--	--	66
5004 Miller Field	80	--	L.I.M.	07/01-09/30	9	9	--	9	--	--	--	9	9	--	--	--	9
5005 Harris FFR	160	--	L.I.M.	04/16-07/31	22	22	--	22	--	--	--	22	22	--	--	--	22
†5101 Devine Ridge	8,642	1,914	*3-E,F	04/01-09/30	1,307	1,257	-470	787	22	--	--	809	1,181	44	--	--	1,225
5102 Prather Creek	1,025	783	*1-A	06/01-07/31	54	41	--	41	8	--	--	49	41	16	--	5	62
†5103 Lime Kiln	3,314	1,111	*2-E	04/16-07/31	385	222	--	222	5	--	--	227	225	10	--	59	294
†5104 Soldier Creek	2,673	3,481	*3-E	04/16-07/31	200	102	--	102	3	--	--	105	102	5	--	50	157
†5105 Camp Harney	13,552	3,342	*2-E	04/16-06/19	1,621	854	+14	868	25	--	--	893	868	51	--	653	1,572
†5106 Cow Creek	2,114	2,009	*4-B,D,E,F	05/01-08/31	230	336	-106	230	4	--	--	234	230	8	--	175	413
5107 Manning Field	120	--	L.I.M.	06/01-07/31	10	10	--	10	--	--	--	10	10	--	--	--	10
†5108 Little Cow Crk.	2,777	1,968	4-D	04/16-08/15	500	468	-71	397	8	--	63	468	463	15	--	72	550
5109 Purdy FFR	73	--	L.I.M.	04/01-09/30	48	48	--	48	--	--	--	48	48	--	--	--	48
5110 Reed FFR	130	--	L.I.M.	06/01-09/15	18	18	--	18	--	--	--	18	18	--	--	--	18
5111 Temple FFR	360	--	L.I.M.	04/01-10/31	28	28	--	28	--	--	--	28	28	--	--	--	28
5112 Smith FFR	120	--	L.I.M.	Exchange of Use													
†5201 Coleman Creek	2,900	3,113	*2-D	04/01-10/15	525	424	--	424	5	--	71	500	525	9	--	67	601
5202 Hunter	2,648	3,777	2-D	04/01-08/31	453	940	-487	453	12	--	12	477	453	24	--	--	477
5203 Catterson	640	640	1-A(5202)	04/01-06/30	125	125	-57	68	5	--	--	73	90	9	--	--	99
5204 Slocum Field	1,917	3,593	*3-D	04/01-08/31	300	300	--	300	7	--	7	314	300	14	--	--	314
†5205 Venator	2,589	4,942	*2-D	04/01-07/31	320	320	--	320	5	--	--	325	320	31	--	11	362
5206 Stockade	910	5,110	L.I.M.	04/01-08/15	162	162	-100	62	--	--	--	62	62	--	--	--	62
†5207 Coyote Creek	1,077	100	*1-C	05/01-07/31	124	110	--	110	--	--	--	110	124	10	--	5	139
5208 Emmerson	1,538	1,987	1-E	05/01-07/31	226	224	--	224	6	--	30	260	226	12	--	22	260
5209 Crane	1,935	2,786	*2-C	05/05-08/18	211	350	--	350	--	--	--	350	350	--	--	50	400
5210 Windy Point	1,051	1,330	*1-D	04/15-09/30	50	50	--	50	3	--	--	53	50	13	--	--	63
5211 Beckly Home	1,494	2,200	*2-A	06/01-10/15	113	109	+1	110	3	--	--	113	113	6	--	70	189
5212 Mahan Ranch	3,058	128	*2-C,D(5210)	04/01-09/30	334	334	--	334	5	--	--	339	334	7	--	97	438
†5213 Beaver Creek	8,572	7,426	*2-D	04/16-07/31	1,200	1,200	-300	900	6	--	--	906	1,200	208	--	4	1,412
†5214 Hamilton	2,445	1,359	*2-C	04/01-10/31	245	245	--	245	2	--	59	306	245	3	--	58	306
5215 Davies	3,442	3,500	*3-C	04/01-09/30	253	258	--	258	2	--	19	279	258	3	--	18	279
5217 Thompson FFR	498	--	*3-D(5210)	04/15-09/30	Information shown with Mahan Ranch Allotment #5212												
5218 Bennett's FFR	320	--	L.I.M.	04/01-09/30	18	18	--	18	--	--	--	18	18	--	--	--	18
5301 Princeton	18,288	4,320	8-D	04/16-07/31	1,917	1,917	--	1,917	5	--	--	1,922	3,649	7	--	218	3,874
5302 Big Bird	2,567	320	*2-F	04/01-06/30	418	418	--	418	--	--	95	513	418	--	--	95	513
5303 Dry Lake	34,729	5,848	3-D	04/01-10/31	2,450	2,741	+639	3,380	120	--	--	3,500	7,272	121	--	--	7,393
5304 Square Butte	5,001	-0-	*2-E	04/01-08/31	625	625	+178	803	1	--	29	833	985	1	--	--	986
5305 Crow's Nest	2,921	-0-	*2-E	05/01-06/30	-	500	--	500	--	--	--	500	800	--	--	200	1,000
5306 Rocky Ford	4,457	-0-	*3-C,D	04/16-08/31	900	900	--	900	--	--	214	1,114	900	--	--	214	1,114
5307 Smyth Creek	29,283	1,370	7-C,D,E	04/01-07/31	3,095	3,095	--	3,095	16	600	--	3,711	3,095	25	600	907	4,627
5308 East Kiger	7,336	1,726	*2-A	04/15-07/15	626	552	--	552	6	360	--	918	552	6	360	--	918
5309 Happy Valley	4,004	480	*2-E	04/16-10/15	821	528	--	528	1	--	1	530	530	43	--	--	573
5310 Riddle Mountain	20,188	2,296	*6-B,E	04/01-10/31	3,376	3,085	--	3,085	11	--	--	3,096	3,366	21	--	--	3,387

Table 1-2 Proposed Action (continued)

Allotment Name and Number	Public Land (acres)	Other Ownership 1/ (acres)	Proposed Number of Pastures and Type of Grazing Use 2/	Proposed Maximum Season of Use	Preference 3/ (AUMs)	1976 Authorized Use (AUMs) 4/	Proposed Livestock Grazing Adjustment (AUMs)	Proposed Initial Forage Allocation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Carrying Capacity (AUMs)	Projected Forage Allocation 10 years after Full AMP Implementation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Projected Carrying Capacity (AUMs)
5311 Government Fld.	1,339	3,531	*1-B(5309)	07/16-08/15	150	150	--	150	2	--	--	152	150	2	--	--	152
5312 Deep Creek	1,000	6/	*1-B(5309)	07/16-10/15	207	207	--	207	1	--	--	208	207	1	--	--	208
5313 Burnt Flat	36,896	6,179	*5-A,C	04/01-10/31	4,568	4,568	--	4,568	27	600	--	5,195	4,568	49	600	288	5,505
5314 Summit Springs	10,873	1,035	*1-A	04/01-06/30	1,400	1,400	--	1,400	7	--	--	1,407	1,400	11	--	446	1,857
5315 S. Fk. Malheur	38,140	4,979	*3-B,C,E	04/01-09/30	3,533	3,519	--	3,519	7	840	1,231	5,597	3,519	11	840	1,493	5,863
5316 Virginia Valley	16,270	1,993	*5-C,D	04/01-08/31	3,140	3,140	+513	3,653	13	--	--	3,666	3,653	22	--	700	4,375
5317 Hatt Butte	1,566	1,560	L.I.M.	10/01-10/31	103	103	--	103	--	--	--	103	103	--	--	--	103
5319 Driveway	1,680	No Licensed Use															
5321 Hamilton Indiv.	1,121	--	*1-B	08/01-09/30	150	142	+1	143	--	--	--	143	143	--	--	--	143
5322 Briggs FFR	1,030	1,000	L.I.M.	08/01-09/30	-	230	--	230	--	--	--	230	230	--	--	--	230
5323 Clemens FFR	240	--	L.I.M.	04/16-08/31	78	78	--	78	--	--	--	78	78	--	--	--	78
5324 West Kiger	1,384	--	*1-E(5308)	04/01-06/30	230	230	--	230	--	--	--	230	230	--	--	--	230
5325 Marshall FFR	320	--	L.I.M.	04/16-08/15	40	40	--	40	--	--	--	40	40	--	--	--	40
5326 Jenkins NL FFR	80	--	L.I.M.	04/01-06/30	30	30	--	30	--	--	--	30	30	--	--	--	30
5327 Jenkins FFR	1,480	--	L.I.M.	08/01-09/30	280	280	--	280	--	--	--	280	280	--	--	--	280
†5501 E.Fk.Cow Creek	2,504	635	2-C	04/20-08/31	325	329	-63	266	4	--	--	270	325	8	--	29	362
†5502 Rock Creek	4,000	849	*5-B,D,E,F	04/16-10/15	644	446	+64	510	21	--	--	531	644	42	--	1	687
†5503 Pine Creek	18,845	13,406	*4-A,F	04/01-08/31	3,259	2,438	-154	2,284	57	--	109	2,450	2,300	114	--	36	2,450
5504 State Field	280	--	L.I.M.	04/16-06/15	48	48	--	48	--	--	--	48	48	--	--	--	48
†5505 Little Muddy	7,215	4,492	*4-B,D,E	05/01-10/31	1,224	1,107	-345	762	56	--	--	818	972	111	--	100	1,183
5506 Muddy	4,128	1,110	3-A,B	05/01-11/15	499	484	-84	400	27	--	--	427	484	54	--	39	577
†5507 Wolf Creek	870	1,110	*1-A	04/01-06/15	135	136	--	136	--	--	--	136	136	--	--	--	136
5508 Baker Knowles	845	11	*1-E	05/01-05/31	140	75	-37	38	4	--	--	42	62	8	--	--	70
5509 William Dripp Sp	1,345	8	*1-E	05/16-06/30	219	176	-85	91	4	--	--	95	159	7	--	--	166
5510 Jones Dripp Spr.	762	235	*1-A	05/16-08/15	120	120	--	120	2	--	2	125	120	4	--	--	124
†5511 Moffet Table	15,212	4,015	*4-D,E	04/16-09/30	3,228	1,908	-382	1,526	32	--	7/ 350	1,908	1,905	59	--	350	2,314
5512 Clark's River 8/	318	110	*1-A	04/01-08/31	40	40	--	40	--	--	5	45	40	5	--	--	45
5513 Shelly & FFR	5,343	620	4-E	05/01-07/31	950	332	-32	300	20	--	12	332	500	40	--	74	614
†5514 Coal Mine Creek	4,577	54	2-D	05/01-08/31	466	412	-176	236	7	--	50	293	414	13	--	139	566
†5515 Mule Creek	4,597	1,706	*2-E,F	04/16-09/15	932	488	-176	312	11	--	--	323	471	22	--	82	575
†5516 Birch Creek	1,340	40	*1-B	07/01-09/25	243	243	--	243	16	--	21	280	243	37	--	--	280
†5517 Otis Mountain	12,991	1,160	*3-E	04/16-09/30	2,514	1,738	--	1,738	29	--	--	1,767	1,738	57	--	92	1,887
5518 Newell Field	990	975	*1-C(5521)	04/01-08/31	155	155	--	155	3	--	7	165	155	6	--	4	165
5519 Big Upson Field	220	--	L.I.M.	11/01-12/31	24	42	-17	25	--	--	--	25	25	--	--	--	25
5520 Little Upson	150	395	*1-A(5521)	04/01-08/31	24	24	--	24	--	--	--	24	24	--	--	--	24
5521 Rocky Basin	3,775	--	3-D,F	04/01-08/31	467	467	-145	322	8	--	--	330	467	16	--	213	696
†5522 Cottonwood	8,397	1,285	*3-D	04/16-09/30	1,183	1,183	-342	841	9	--	--	850	894	17	--	100	1,011
†5523 Hart	1,309	40	*1-A(5517)	04/16-05/16	260	260	-60	200	26	--	34	260	218	53	--	34	305
†5524 Tub Springs	4,169	215	*2-D	04/16-09/24	795	795	-395	400	6	--	60	466	489	11	--	66	566
5525 Mill Gulch	2,284	640	2-D	05/01-08/31	250	525	-275	250	4	--	46	300	400	7	--	46	453
†5526 Chalk Hills	8,951	1,130	*3-E	04/20-08/15	1,692	1,155	-325	830	25	--	300	1,155	991	45	--	300	1,336
5527 Drinkwater Smmt.	2,789	220	1-F	04/01-04/30	462	462	-236	226	15	--	--	241	251	30	--	30	311
†5528 Cooler	5,020	250	*4-B,E	04/16 09/24	530	530	-180	350	25	--	100	475	667	49	--	100	816
5529 House Butte	26,104	2,287	*7-C,D,E,F	04/01-08/31	3,535	2,541	-616	1,925	49	--	475	2,449	3,259	92	--	475	3,826
5530 River	19,652	5,691	*1-B	11/01-12/31	2,160	1,409	-527	882	23	600	250	1,755	1,011	41	600	250	1,902
5531 Stinkingwater	23,741	2,352	*4-B,D,E	04/15-11/30	4,683	3,055	-710	2,345	75	240	500	3,160	3,288	132	240	500	4,160

Table 1-2 Proposed Action (continued)

Allotment Name and Number	Public Land (acres)	Other Ownership 1/ (acres)	Proposed Number of Pastures and Type of Grazing Use 2/	Proposed Maximum Season of Use	Preference 3/ (AUMs)	1976 Authorized Use (AUMs) 4/	Proposed Livestock Grazing Adjustment (AUMs)	Proposed Initial Forage Allocation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Carrying Capacity (AUMs)	Projected Forage Allocation 10 years after Full AMP Implementation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Projected Carrying Capacity (AUMs)
5532 Mountain	37,211	8,555	*3-D	05/01-09/30	6,617	3,054	-142	2,912	42	620	100	3,674	3,756	82	620	100	4,558
†5533 Buchanan	2,328	2,103	*2-D	04/01-10/31	263	154	--	154	7	--	102	263	249	14	--	--	263
†5534 Mahan Creek	2,545	80	*2-E,F	04/16-07/15	457	274	-1	273	13	--	--	286	273	26	--	80	379
5535 Miller Canyon	6,732	850	1-D	05/01-08/31	1,110	740	-508	232	73	--	25	330	463	145	--	25	633
5536 Alder Creek	29,949	8,607	4-B,D,E	05/01-08/31	2,552	2,552	-552	2,000	128	--	300	2,428	2,553	249	--	300	3,102
5317 Hatt Butte	1,566	1,560	L.I.M.	10/01-10/31	103	103	--	103	--	--	--	103	103	--	--	--	103
5319 Driveway	1,680	No Licensed Use															
5537 Buck Mountain	14,719	2,122	3-D,F	04/01-08/31	1,921	1,500	--	1,500	36	--	385	1,921	1,926	49	--	635	2,610
†5538 Riverside	14,191	4,884	4-D,E	04/01-08/31	2,692	2,462	-783	1,679	17	--	400	2,096	2,305	29	--	400	2,734
5539 W&C Blaylock	410	--	L.I.M.	11/01-12/31	30	30	--	30	49	--	--	79	30	49	--	--	79
5540 Luce Field	225	--	L.I.M.	12/01-12/31	13	13	--	13	--	--	--	13	13	--	--	--	13
5541 Wilber FFR	1,233	--	*1-C	04/16-09/30	207	100	--	100	5	--	--	105	100	9	--	--	109
5542 Marshall FFR	302	--	L.I.M.	04/16-08/15	40	12	+8	20	--	--	--	20	20	--	--	--	20
5543 Devine Fld. FFR	630	--	L.I.M.	04/01-10/31	105	105	--	105	--	--	--	105	105	--	--	--	105
5544 Brooks Field	515	--	*1-A(5515)	04/23-05/31	50	50	+18	68	--	--	--	68	68	--	--	--	68
5545 Sunshine Field	463	--	L.I.M.	06/01-09/30	52	52	--	52	--	--	--	52	52	--	--	--	52
5546 Drewitt Fld FFR	746	--	L.I.M.	04/16-11/30	30	30	-8	22	--	--	--	22	22	--	--	--	22
5547 Lake Field	160	--	L.I.M.	04/01-10/30	21	21	--	21	--	--	--	21	21	--	--	--	21
5548 Beaubian FFR	740	--	L.I.M.	09/01-10/31	116	116	--	116	--	--	--	116	116	--	--	--	116
5549 Howard FFR	392	--	L.I.M.	10/01-11/30	30	30	--	30	--	--	--	30	30	--	--	--	30
5550 Jordan FFR	60	--	L.I.M.	05/01-05/31	6	6	--	6	--	--	--	6	6	--	--	--	6
5551 Lillard FFR	40	--	L.I.M.	04/01-09/15	17	17	-10	7	--	--	--	7	7	--	--	--	7
5552 Miller FFR	320	260	L.I.M.	04/16-04/30	20	20	--	20	--	--	--	20	20	--	--	--	20
5553 Miller FFR	40	70	L.I.M.	04/01-08/31	5	5	--	5	--	--	--	5	5	--	--	--	5
5554 Miller J.Francis	320	--	L.I.M.	05/01-07/15	25	25	+4	29	--	--	--	29	29	--	--	--	29
5555 Ott FFR	64	688	L.I.M.	04/01-08/31	5	5	--	5	--	--	--	5	5	--	--	--	5
5556 Pine Creek FFR	1,298	--	L.I.M	04/01-12/31	178	180	--	180	--	--	--	180	180	--	--	--	180
5557 J&G FFR	180	--	L.I.M.	04/01-10/31	28	28	--	28	--	--	--	28	28	--	--	--	28
5558 J&G FFR	130	--	L.I.M.	09/01-11/3	33	33	--	33	--	--	--	33	33	--	--	--	33
5559 Sword FFR	180	--	L.I.M.	11/01-12/31	32	32	--	32	--	--	--	32	32	--	--	--	32
5560 Vicker's FFR	470	2,500	L.I.M.	04/01-06/30	75	75	-23	52	--	--	--	52	52	--	--	--	52
5561 Pat Wilber FFR	1,335	--	L.I.M.	04/01-04/30	125	121	--	121	--	--	--	121	121	--	--	--	121
5562 Williams FFR	240	--	L.I.M.	08/01-10/31	24	24	--	24	--	--	--	24	24	--	--	--	24
5563 Arnold FFR	160	--	L.I.M.	09/01-09/30	23	23	--	23	--	--	--	23	23	--	--	--	23
5564 Wheeler Basin	4,981	9/	*1-F(5530)	04/19-04/30	960	735	-205	530	11	--	43	584	576	14	--	43	633
5565 Upton Mountain	13,407	9/	*2-D(5530)	05/01-09/30	2,386	1,530	-197	1,333	24	--	149	1,506	1,447	37	--	149	1,633
5566 Texaco Basin	10,712	9/	*3-B(5530)	05/01-09/30	2,800	1,900	-500	1,400	29	100	300	1,829	2,487	46	100	300	2,933
TOTALS	654,997	177,996			91,591	76,348	-8,442	67,906	1,345	3,960	5,956	79,167	84,097	2,647	3,960	11,069	101,773

1/ No ownership information was available where a dash (--) is shown.
2/ Grazing system is included in an AMP with the allotment shown in parenthesis, i.e. (5202).
3/ See glossary for definition of preference.
4/ Average AUMs of livestock use for the past several years which also represents actual use.
5/ Less Intensive Management (L.I.M.).
6/ Other ownership is listed with the Government Field Allotment #5311.
7/ 250 AUMs for primitive and visual values.
8/ Sheep grazing use only; all other allotments are grazed by cattle.
9/ Other ownership is listed with the River Allotment #5530.

A = Continuous Grazing
B = Deferred Grazing
C = Rotation Grazing
D = Deferred Rotation Grazing
E = Rest Rotation Grazing
F = Early Use
* Grazing system was in use prior to 1976.
† Existing AMP, not fully implemented.

species; (2) range improvements to facilitate implementation of the grazing system; and (3) a program of rangeland studies to measure progress toward the AMP objectives. In addition, the AMP designates the season of use and the number of livestock permitted on the range. When implemented, the provisions of the AMP become a stipulation of the grazing permit.

Of the 68 proposed AMPs, 28 AMPs (188,744 acres) have been in effect for periods from 6-11 years. These are considered only partially implemented as additional water is needed to make them fully effective during dry years. The proposal is to continue these existing AMPs to full implementation. Data obtained from observation and evaluation of existing AMPs were used in developing the remainder of the proposed AMPs (Tables 1-2, 1-3, and 2-6).

Typical rangeland in northern part of the Drewsey ES area

1.2.2.1 Grazing Systems

A grazing system is the key part of the proposed AMPs. It consists of one or more planned grazing treatments which use livestock grazing to bring about changes in the kind or amount of vegetation. These changes are determined by measuring vigor, reproduction, and composition of key forage species. Key forage species are those plants which serve as indicators of changes occurring in the vegetation communities. See Appendix A for a listing of key forage species by allotment.

Six types of grazing systems are employed in the Drewsey ES area:

Continuous:	Systems involving grazing use during the entire growing season every year.
Deferred:	Systems that delay grazing until after the end of the growing period each year.
Rotation:	Systems that rotate short periods of grazing during the growing period with periods of rest.

Table 1-3
Existing and Proposed Grazing Systems
(acres)

Allotment Name and Number	Continuous Existing	Continuous Proposed	Deferred Existing	Deferred Proposed	Rotation Existing	Rotation Proposed	Deferred Rotation Existing	Deferred Rotation Proposed	Rest Rotation Existing	Rest Rotation Proposed	Early Existing	Early Proposed
5101 Devine Ridge									6,892	Same	1,750	Same
5102 Prather Creek	1,025	Same										
5103 Lime Kiln									3,314	Same		
5104 Soldier Creek									2,673	Same		
5105 Camp Harney									13,552	Same		
5106 Cow Creek			904	Same			45	Same	645	Same	520	Same
*5108 Little Cow Creek	2,777	-0-					-0-	2,777				
5201 Coleman Creek							2,900	Same				
*5202 Hunter	2,648	-0-					-0-	2,648				
5203 Catterson	640	Same										
5204 Slocum Field							1,917	Same				
5205 Venator							2,589	Same				
5207 Coyote Creek					1,077	Same						
*5208 Emmerson	1,538	-0-							-0-	1,538		
5209 Crane					1,935	Same						
5210 Windy Point							1,051	Same				
5211 Beckly Home	1,494	Same										
5212 Mahan Ranch					1,359	Same	1,699	Same				
5213 Beaver Creek							8,572	Same				
5214 Hamilton					2,445	Same						
*5215 Davies	3,442	-0-			-0-	3,442						
5217 Thompson FFR							498	Same				
*5301 Princeton	9,207	-0-					9,081	18,288				
5302 Big Bird									2,567	Same		
*5303 Dry Lake							34,729	33,574	-0-	1,155		
5304 Square Butte									5,001	Same		
5305 Crow's Nest									2,921	Same		
5306 Rocky Ford					317	Same	4,140	Same				
*5307 Smyth Creek	14,085	-0-	12,019	-0-	-0-	11,225	3,179	15,634	-0-	2,424		
5308 East Kiger	7,336	Same										
5309 Happy Valley									4,004	Same		
5310 Riddle Mountain			9,919	Same					10,269	Same		
5311 Government Field			1,339	Same								
5312 Deep Creek			1,000	Same								
5313 Burnt Flat	25,563	Same			11,333	Same						
5314 Summit Springs	10,873	Same										
5315 S. Fk. Malheur			23,265	Same	10,884	Same			3,991	Same		
5316 Virginia Valley					5,586	Same	10,684	Same				
5321 Hamilton Indiv.			1,121	Same								
5324 West Kiger									1,384	Same		
*5501 E.Fk.Cow Creek	2,504	-0-			-0-	2,504						
5502 Rock Creek			433	Same			440	Same	2,857	Same	270	Same
5503 Pine Creek	13,201	Same									5,644	Same
5505 Little Muddy			849	Same			4,908	Same	1,458	Same		
*5506 Muddy	3,453	2,988	-0-	1,140							675	-0-
5507 Wolf Creek	870	Same										
5508 Baker Knowles									845	Same		
5509 William Dripp Spr.									1,345	Same		
5510 Jones Dripp Spr.	762	Same										
5511 Moffet Table							5,977	Same	9,235	Same		
5512 Clark's River	318	Same										
*5513 Shelly & FFR	5,343	-0-							-0-	5,343		
*5514 Coal Mine Creek	4,577	-0-					-0-	4,577				
5515 Mule Creek									2,443	Same	2,154	Same
5516 Birch Creek			1,340	Same								
5517 Otis Mountain									12,991	Same		
5518 Newell Field					990	Same						
5520 Little Upson	150	Same										
*5521 Rocky Basin	3,775	-0-					-0-	2,732			-0-	1,043
5522 Cottonwood							8,397	Same				
5523 Hart	1,309	Same										
5524 Tub Springs							4,169	Same				
*5525 Mill Gulch	2,284	-0-					-0-	2,284				
5526 Chalk Hills									8,951	Same		
*5527 Drinkwater Summit					2,789	-0-					-0-	2,789
5528 Cooler			2,065	Same					2,955	Same		
5529 House Butte					3,837	Same	14,310	Same	6,780	Same	1,177	Same
5530 River			19,652	Same								
5531 Stinkingwater			11,974	Same			8,361	Same	3,406	Same		
5532 Mountain							37,211	Same				
5533 Buchanan							2,328	Same				
5534 Mahan Creek									1,775	Same	770	Same
*5535 Miller Canyon	6,732	-0-					-0-	6,732				
*5536 Alder Creek	29,949	-0-	-0-	8,587			-0-	5,299	-0-	16,063		
*5537 Buck Mountain	14,719	-0-					-0-	10,089			-0-	4,630
*5538 Riverside							14,191	7,092	-0-	7,099		
5541 Wilber FFR					1,233	Same						
5544 Brooks Field	515	Same										
5564 Wheeler Basin											4,981	Same
5565 Upton Mountain							13,407	Same				
5566 Texaco Basin			10,712	Same								

Acres by Grazing System	Continuous	Deferred	Rotation	Deferred Rotation	Rest Rotation	Early
existing:	171,089	96,592	43,785	194,783	112,254	17,941
proposed:	67,044	94,300	58,167	245,329	145,876	25,728

Total Acres in Grazing Systems: 636,444

*Allotments where proposed grazing system differs from the existing system.

Deferred Rotation:	Systems that delay grazing until after the growing period on a pasture within the allotment each year and rotate this delay among pastures in successive years.
Rest Rotation:	Systems that incorporate at least a 1-year rest period as a primary treatment and rotate this treatment among pastures in successive years.
Early:	Systems that involve grazing during the early part of the growing season followed by rest for the balance of the growing period.

One or more of the six grazing systems is presently in use in each of the 81 allotments proposed for intensive livestock management (Table 1-3). No change in the existing system is proposed for 63 allotments (452,747 acres). The following general criteria were considered in selecting the type of grazing system for each allotment:

- The adequacy of the existing grazing system
- Location and types of existing range improvements
- Satisfaction of the permittee's management needs and objectives
- Potential for development of new range improvements
- The existing vegetation and its physiological requirements
- Topography and elevation
- Land ownership patterns
- Habitat requirements for wild horses and wildlife
- Existing cooperative management agreements with the U.S. Forest Service
- Soil characteristics
- Range condition and trend

Each of the six systems proposed for use is described below. Although each description outlines a general period of grazing use, there is some variation within this period among the 81 allotments. For the purpose of this discussion, the period of use refers to the grazing season of April 1 to October 31, with the exception of winter use on 19,652 acres in Allotment 5530.

Continuous Grazing

Continuous grazing is proposed for use on one or more pastures within 14 allotments (67,044 acres). In all cases, it is proposed on areas where continuous use has already been in effect for at least 5 years.

Continuous use is presently working satisfactorily on 28,734 acres which are in good range condition and 11,399 acres which exhibit upward trend. This system is proposed for continuation on the remaining 26,911 acres for one or more of the following reasons:

1. The existing livestock water is not adequate for other grazing systems and there is no cost-effective method of water develop ment available.

2. The additional fences required for other grazing systems would conflict with wild horse management objectives.

3. Private lands compose 50 percent or more of the allotment.

Utilization of native key forage species listed in Table 1-5 would be limited to 50 percent of their annual vegetative production. Crested wheatgrass utilization would be limited to a maximum of 60 percent.

A typical season-long system is shown as follows:

Every Year

Graze during entire growing season

4/16 9/30

Continuous grazing is proposed for 67,044 acres, or 11 percent of the public lands in the ES area.

Deferred Grazing

The deferred grazing system consists of delaying grazing use every year until the key forage species listed in Table 1-5 have essentially completed their annual growth. The deferment or delay occurs on the same area each year and would not be rotated because only one pasture would be involved. This grazing system is proposed for use on pastures within 15 allotments. The deferred grazing system is now in use on 14 of these allotments. Although most livestock grazing included in the deferred system takes place during late summer and fall, a portion of Allotment 5530 would be deferred until winter.

Deferred grazing was selected for the 15 allotments for one or both of the following reasons:

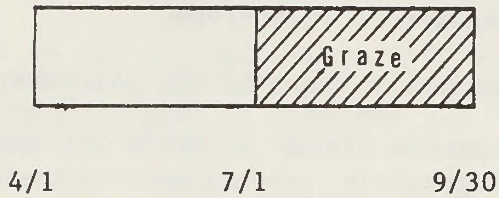
1. The system is already in use on 84,573 acres and is working satisfactorily as evidenced by good range condition on 45,565 acres and upward trend on 20,767 acres.

2. The system would meet resource objectives (Appendix A), be compatible with the grazing systems on adjacent pastures and meet permittee management need without any additional funds.

Utilization of native key forage species (Table 1-5) would be limited to 70 percent of their annual vegetative production except 320 acres in Allotment 5506 which would be restricted to 50 percent utilization (Table 1-4). Crested wheatgrass utilization would be limited to a maximum of 80 percent.

A typical deferred grazing system is shown as follows:

Every Year



Delay grazing until after seedripe of key forage species

Deferred grazing is proposed for 94,300 acres or 15 percent of the public lands.

Rotation Grazing System

Rotation grazing on native range normally involves two pastures and consists of short periods of grazing (between 6 and 10 weeks) in one pasture, then the other, in regular succession. Grazing takes place in every pasture yearly during part of the growing period. However, use occurs at different times in successive years to avoid grazing the key forage species during the same growth stage 2 years in a row.

In pastures where crested wheatgrass has been seeded, rotation grazing consists of a short period of early use (4 weeks) every year in April followed by a 2 month rest from grazing until the end of the growing period. Following plant maturity in late summer, grazing is again allowed in October as shown in the diagram below. This variation is called early-late grazing and normally only involves one pasture.

A rotation grazing system is now being used in 11 allotments (40,995 acres) and is proposed for use on one or more pastures in 3 additional allotments, for a total of 58,167 acres.

Rotation grazing was selected for the 14 allotments for one or both of the following reasons:

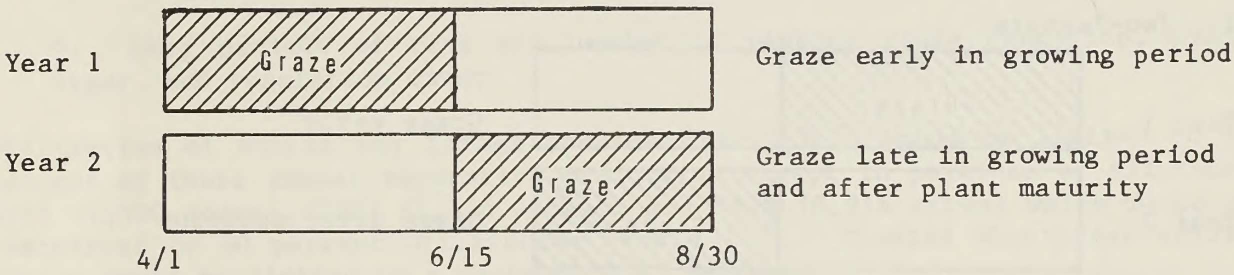
1. The system is already in use on 40,993 acres and is working satisfactorily as evidenced by good range condition on 16,528 acres and an upward trend on 14,364 acres.

2. The pasture has been seeded with crested wheatgrass and the early-late grazing use allows for a delay of grazing on the adjacent pastures containing native species.

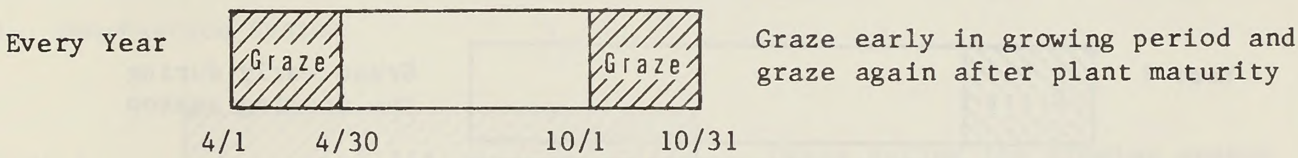
Utilization of native key forage species (Table 1-5) would be limited to 50 percent of their annual vegetative production. Early use of crested wheatgrass would be limited to a maximum of 70 percent of the plant growth available during the grazing period. Late use would be limited to 50 percent of annual production.

The following are typical rotation systems:

1. Two-Pasture (Native Range)



2. One-Pasture (Crested Wheatgrass)



Rotation grazing is proposed for 58,167 acres, or 9 percent of the public lands.

<u>Deferred Rotation Grazing</u>

Deferred rotation grazing is designed to delay grazing until after the growing season on various parts of the range in succeeding years. This delay is rotated among pastures during the cycle. This system provides rest from livestock grazing 25 to 50 percent of the time. This type of grazing is now in use in 24 allotments and proposed for use on one or more pastures in 8 additional allotments.

Deferred rotation was selected for use on 32 allotments for one or both of the following reasons:

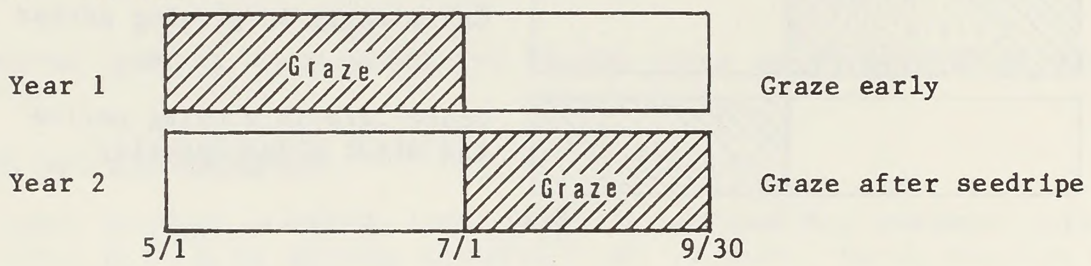
1. The deferred rotation system is presently in use on 186,529 acres and is working satisfactorily on 89,043 acres as evidenced by their good range condition. Upward trend is exhibited on 16,606 acres.

2. The system would meet AMP resource objectives listed in Appendix A, be compatible with the grazing systems on adjacent pastures, and meet permittee management needs.

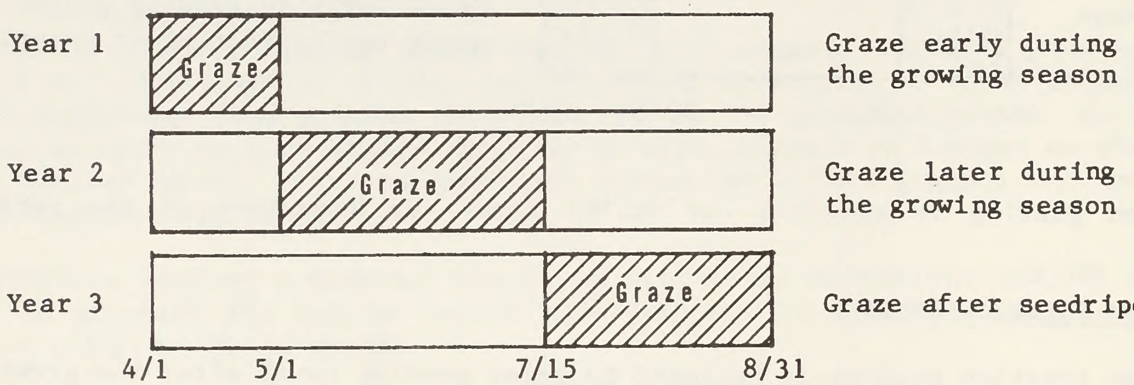
Utilization of native key forage species (Table 1-5) would be limited to 60 percent of their annual vegetative production except in a portion of Allotment 5511 which would have restrictive use (Table 1-4). Crested wheatgrass utilization would be limited to a maximum of 80 percent during the early spring grazing treatment. Utilization at other times would be less than 60 percent.

Following are typical deferred rotation systems:

1. Two-Pasture



2. Three-Pasture System



Deferred rotation is proposed on 245,329 acres, or 38 percent of the public lands.

Rest Rotation Grazing

Rest rotation grazing is a form of deferred rotation in which at least one pasture is rested from grazing for a minimum of a full year. A pasture or unit of range is rested from use after a season of grazing to allow plants

opportunity to make and store food to recover vigor, allow seed to be produced, allow seedlings to become established, and allow litter to accumulate between plants. The amount of rest needed for these purposes depends on the plants involved, character of the range, and management objectives which are determined for each individual allotment.

This type of grazing is now in use in 24 allotments (109,594 acres) and proposed for use on 6 additional allotments for a total of 145,876 acres.

Rest rotation was selected for use in 30 allotments for one or more of the following reasons:

1. The present system is presently in use on 109,594 acres and is working satisfactorily as evidenced by good range condition on 63,307 acres and upward trend on 28,904 acres.

2. Long periods of rest are needed to restore range condition, plant vigor, and vegetation cover.

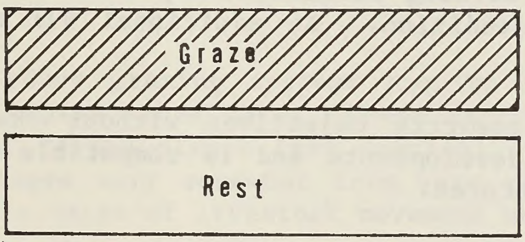
Utilization of native key forage species (Table 1-5) would be limited to 70 percent of their annual vegetative production except in portions of Allotment 5105 (1,500 acres), 5303 (1,550 acres), and 5536 (8,216 acres) which would be restricted to 50 percent utilization (Table 1-4). Crested wheatgrass utilization would be limited to a maximum of 80 percent.

Following are typical rest rotation systems:

1. Two-Pasture System

Year 1

Year 2



5/1 9/30

Year 1: Graze during the growing season and after seedripe.

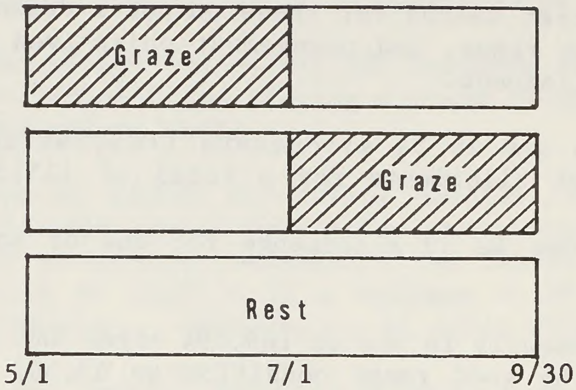
Year 2: Rest for the entire year.

2. Three-Pasture System

Year 1 — Graze during the growing period.

Year 2 — Graze after seedripe

Year 3 — Rest the entire year.



Rest rotation is proposed on 145,876 acres, or 23 percent of the public lands.

<u>Early Grazing</u>

Under this system, grazing normally takes place only during April. At the end of the month all livestock are removed and no further grazing occurs until the following April. This system involves only one pasture, therefore the grazing takes place each year on the same area.

Early grazing presently occurs in nine allotments (17,263 acres) and is proposed for use in three additional allotments (8,365 acres). Early use was selected for the 11 allotments for one or both of the following reasons:

1. Early grazing system is working satisfactorily on 971 acres as evidenced by their good range condition. An additional 971 acres are in upward trend.

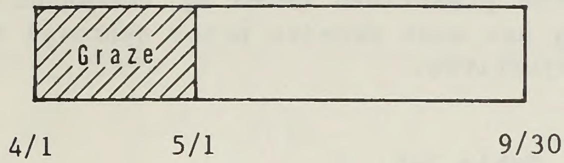
2. The system can attain resource objectives without the expense of additional fences and water developments and is compatible with grazing systems in use on adjacent pastures.

3. The system allows efficient forage utilization of early maturing annual and perennial grasses.

Utilization of native key forage species (Table 1-5) would be limited to 20 to 40 percent of their annual vegetative production. However, because the use occurs before full growth has been achieved, utilization may reach 80 percent of growth occuring in April.

A typical early grazing system is shown as follows:

Every Year



Graze early during the growing season.

Early use would cover 25,728 acres, or 4 percent of the public lands.

Restrictive Use

Approximately 11,876 acres included in three of the above grazing systems would be fenced into restrictive use pastures to reduce livestock use of riparian vegetation (Table 1-4; Figures 1-1 and 1-2). Livestock would be removed when utilization of riparian vegetation reaches 50 percent of the annual vegetative production of the key riparian species (Kentucky bluegrass).

Table 1-4
Areas Proposed for Restrictive Use

Figure 1-2 Reference No.	Allotment	Acres	Public Stream Miles	Maximum Utilization of Riparian Vegetation	Grazing System
1	5511	1,840	3.9	50%	Deferred Rotation
2	5536	8,216	2.1	50%	Rest Rotation
3	5105	1,500	2.7	50%	Rest Rotation
4	5506	320	1.0	50%	Deferred
5	5303	1,550	1.5	50%	Rest Rotation
		13,426	11.2		

Flexibility

All of the above grazing systems require livestock movement in and out of pastures on a prescribed date. These dates are based on stages of growth of the important forage plants (key species). As indicated in Table 1-5, dates of growth stages vary somewhat from year to year; thus, a certain amount of variability in dates of livestock movement would be allowed.

Additional flexibility could be allowed in the form of:

- Reduced livestock numbers in response to a lack of forage production in any one season or growing year.

- Increased or decreased livestock numbers temporarily to achieve a predetermined degree of utilization.

Stocking rates would not exceed the allotment grazing capacity. In all cases, the initial allocation for wildlife, wild horses, and watershed would be met. In addition, all livestock would be removed from the grazed pastures on or

before the date that the maximum degree of utilization specified for the system has been reached. (See Monitoring and Management Adjustment Section 1.2.2.3). All deviations from the prescribed dates of livestock movement or the authorized amount of grazing use must receive prior approval from BLM and be consistent with management objectives.

Table 1-5

Approximate Growth Stage Dates for Key Forage Species

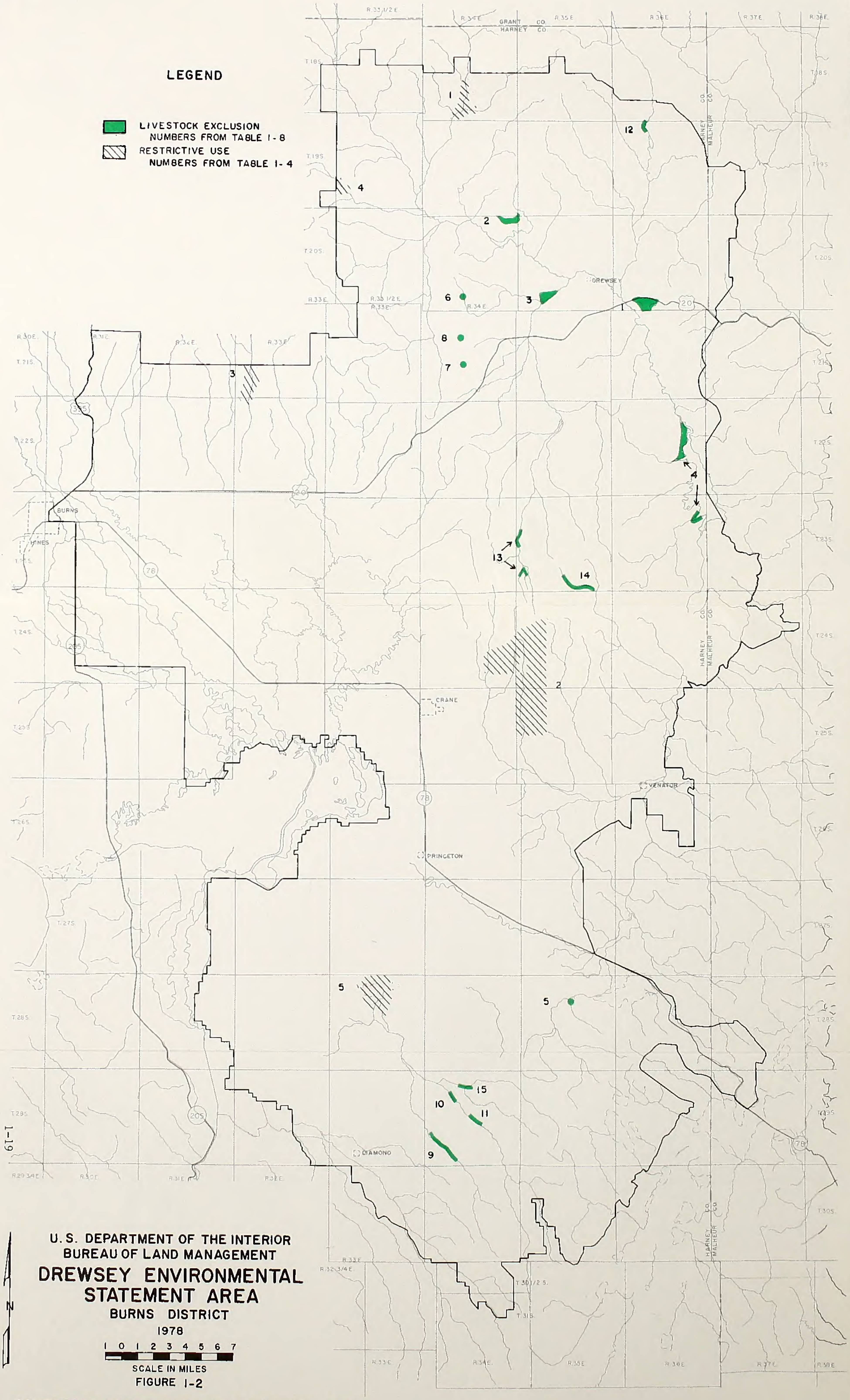
Key Species 1/	Start Growth	Peak of Flowering	Seed Ripe
Bluebunch wheatgrass	4/1	6/20	7/15
Idaho fescue	4/1	6/15	7/15
Squirreltail	4/1	6/10	6/30
Thurbers needlegrass	4/1	6/20	7/5
Crested wheatgrass 2/	3/25	6/15	7/15
Sandberg bluegrass	4/1	6/10	6/30
Kentucky Bluegrass 3/	4/1	6/15	7/15

1/ See Appendix E for plant scientific names.
2/ Key species for seeded areas.
3/ Key species for riparian areas.

Note: Dates may vary 15 to 30 days depending upon exposure and elevation. In addition, annual variation of 10 to 15 days due to climatic conditions is quite common.

1.2.2.2 Range Improvements

To implement intensive grazing management, additional range improvements are usually needed. Additional fences are needed to hold livestock in specific areas or pastures to enable the proposed grazing systems to be applied. Fences and cattle guards would control movement of livestock. Additional water sources are also needed to provide dependable livestock water in all pastures. The success of proposed grazing systems depends on having pastures with sufficient livestock water during the season they are to be grazed. In addition, land treatment may also be needed to improve range conditions. Anticipated increases in carrying capacity through land treatment would not be allocated until seedings are established and ready for use. All seedings would be rested no less than two full growing seasons for seedling establishment.



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

1978

SCALE IN MILES

FIGURE 1-2

LIVESTOCK RESTRICTION AND EXCLUSION AREAS

Construction of 70.7 miles of fence, 230 reservoirs, 109 springs, 53 miles of pipeline, 4 wells, and 24 cattle guards is proposed. In addition, 32,782 acres are proposed for seeding. Drawings and construction standards for the various range improvements are on file at the BLM Burns District Office. The locations of the proposed and existing range improvements are shown on Figure 1-1 (folded map in back of ES). A list of the proposed range improvements by allotment is included in Section 1.3 Implementation of the Proposed Action.

BLM is mandated by law, executive orders, manual requirments and policies to adhere to certain stipulations to protect fragile resources before any proposed improvement or action is implemented on public lands.

The following general stipulations would be followed in the construction of the proposed range improvements in order to protect resource values and reduce adverse impacts caused by construction:

- Any work in riparian areas would be done by hand labor to prevent damage from heavy equipment.

- In accordance with BLM policy, archeological clearance would be required for all project sites prior to new construction. Intensive surveys would be conducted to locate any cultural or paleontological remains. If remains are discovered, the improvement project would be relocated or redesigned. If the project cannot be moved, a data recovery or salvage program would be completed before construction. All mitigative measures would be developed in consultation with the State Historic Preservation Officer and National Advisory Council for Historic Preservation. The clearance process would comply with relevant laws and required procedures throughout. (BLM Policy, Historical Preservation Act of 1966, National Environmental Policy Act of 1969, Executive Order 11593, 36 CFR 800). Permits required for construction would contain stipulations to protect buried resources and provide for additional surveys should project location be changed.

- Prior to construction, BLM requires a survey of the project site for plants and animals listed or proposed for listing on Federal and State lists of threatened and endangered species. The U.S. Fish and Wildlife Service (FWS) would also be consulted prior to construction. All projects which would adversely affect any listed or proposed threatened or endangered species would either be modifed, relocated or abandoned. Mitigative measures would be developed in consultation with the FWS and/or Oregon Department of Fish and Wildlife. (BLM Policy, 50 CFR 402, Endangered Species Act of 1973).

- The wilderness inventory required by Section 603(a) of the Federal Land Policy and Management Act (FLPMA) has not been completed on the public lands that would be impacted by the proposal. Prior to implementation of any range improvements related to the proposed action, the areas would be inventoried for wilderness resources that meet the criteria

established for Wilderness Study Areas and impacts caused by the proposed action would be assessed. Grazing uses beginning after October 21, 1976 or expanded grazing uses or range improvements may be allowed if they do not impair the suitablity of the area for wilderness preservation. Grazing uses existing on October 21, 1976 may continue in the same manner and degree established on that date so long as they do not cause unnecessary or undue degradation of the lands and their resources.

- Surface disturbance at all project sites would be held to a minimum. (BLM Policy)

- All construction areas would be reseeded with a mixture of grasses and forbs as soon as possible in order to replace ground cover on the sites. (BLM Policy)

- Visual resource management (VRM) procedures would be employed to minimize the adverse visual impacts created by the proposed range improvements (BLM Policy).

- Ramps or floatboards would be provided in all water troughs for small birds and mammals to gain access to the water and/or to escape.

Additional design features are identified in the following discussion of the individual types of improvements.

Reservoir Construction

Development of reservoirs would involve the construction of 6 pits and 224 dams to impound water for livestock and wildlife use. Pits would be in dry lake beds or other natural depressions. Dams would be constructed in drainages. Water storage capacity would range from 1.0 to 2.0 acre-feet. Fill material, if needed, would come from the impoundment area and/or a borrow area for dams. Excavated material from pits would be piled adjacent to the pit. Topsoil would be stockpiled and used to rehabilitate the borrow areas.

Wells

Each of the four wells would be cased with steel pipe and sealed with concrete to prevent cave-ins and contamination. All State of Oregon water-well drilling regulations would be adhered to both in drilling and equipping. Two wells, located in Allotment 5503, would be powered by windmills. The other two wells, located in Allotments 5301 and 5313, would have electric pumps. One-half mile of transmission line would be required for the well in Allotment 5301. A safety device would be installed on new powerline transformers to prevent electrocution of raptors. Metal storage tanks, painted to blend with the surrounding landscape, would be placed at each well site. Generally, the tanks would be enclosed and would measure 15 to 30 feet in diameter and 6 to 12 feet high.

Springs

The proposed action includes the development of 109 springs. This would involve digging or drilling to intercept naturally occurring water flow, installing perforated pipe or concrete boxes to collect water, and installing pipelines and water troughs. The spring source and trough overflow area would be fenced to prevent livestock grazing and trampling. A small waterhole would be developed inside the fenced overflow area for wildlife use.

Pipelines

Fifty-three miles of pipeline are proposed to carry water for livestock from wells to crested wheatgrass seedings that lack an adequate water supply. Generally, 1 to 2-inch diameter plastic pipe would be buried with a pipe-laying device consisting of a modified ripper tooth mounted on a tractor. The pipe is normally laid as deeply as possible under the ground but no deeper than 30 inches. Where obstructions prohibit burying, the pipe would be laid on the surface and covered with borrowed soil. Ten reservoirs would be constructed along the pipeline and fenced to exclude livestock. This would provide ground level water for wildlife, and serve as an emergency water supply in case of equipment failure. Water troughs would be installed approximately every mile along the pipeline.

Fences and Cattle Guards

Approximately 71 miles of fence are proposed. These would be designed to prevent the passage of livestock without stopping the movement of wildlife. The 24 miles of fence proposed in antelope areas as shown on Figure 2-8 would be constructed in accordance with Bureau Manual 1737. All other fences would be four-strand barbed wire with a maximum height of 42 inches with the bottom wire a minimum of 16 inches from the ground. The proposed fence lines would not be bladed or scraped. In addition to the proposal's 71 miles of fence, approximately 15 miles would be constructed to fence 5 existing reservoirs, 10 of the proposed reservoirs, and 11 miles of stream to exclude livestock use for the protection of riparian vegetation. (See Section 1.4 Interrelationships.) All fences would comply with VRM design procedures.

Where fences cross existing roads either gates or cattle guards would be installed. Twenty-four cattle guards and adjacent gates are proposed for installation in both new and existing fences.

Seeding

Seeding is proposed on 32,782 acres which have almost no perennial grass cover. No seedbed preparation is required on 21,923 acres, because most woody species have been eliminated by wildfire. Of the 21,923 acres, 15,700 are dominated by annuals and 4,100 acres, in Allotments 5530 and 5538, are virtually devoid of all vegetation. These areas are located in 24 different allotments and range in size from 200 to 4,205 acres. (See Table 1-6.)

The remaining 10,859 acres require seedbed preparation by removal of big sagebrush. This would be done by aerial application of 2,4-D herbicide and/or brush beating. These sites, which have dense stands of big sagebrush and a very sparse perennial grass cover, are located in three allotments (5101, 5303, 5529) and range in size from 800 to 7,559 acres (See Table 1-6). The total project would involve 18,030 acres; however, sagebrush would only be removed on 10,859 acres. The remaining 7,171 acres would be left as irregular patches, strips and edges. Each site would be examined to identify conflicts with wildlife species. Wildlife habitat such as sage grouse strutting grounds and nesting areas would be protected and excluded from treatment as part of the leave strips and patches.

Seeding was selected because the existing sparse perennial grasses would not respond to livestock management alone within a reasonable time frame (20 years). The entire 32,782 acres would be seeded with crested wheatgrass and yellow sweetclover using standard rangeland or deep furrow drills.

Where deep furrow drills are used, slopes would be drilled on the contour to prevent water erosion. Livestock grazing would be deferred for a minimum of two full growing seasons to allow seedling establishment.

Chemical treatment is the preferred method of sagebrush control because it is less costly than brush beating and can be applied to rocky lands. An unknown portion of the 10,859 acres proposed for sagebrush control would be sprayed with 2,4-D (low volatile formulation). This herbicide would be applied in a water carrier at a rate of 2 pounds active ingredients per acre. To minimize drift and volatilization, aerial spraying would be confined to periods when wind speed is less than 6 miles per hour, air temperature is under 70 degrees, relative humidity is over 50 percent, precipitation is not occurring or imminent, and air turbulence will not affect normal spray patterns. Either fixed wing aircraft or helicopters would be used for all spraying. A protective buffer strip at least 100 feet wide on both sides of all live streams (those flowing water at the time of application) and around water bodies would be required. In the design of each spray project any critical riparian habitat would be identified by district biologists and such areas would be excluded from the project. If spraying is to be undertaken adjacent to private lands containing cropland, pasture, or dwellings, a buffer strip at least 100 feet wide would be required. Any application of 2,4-D would be in accordance with State regulations and BLM Manual 9220. A more thorough discription of design features applicable to the proposal may be found in BLM's final environmental statement on Vegetation Management with Herbicides--Western Oregon (USDI, BLM 1978e). Western Oregon design fetures are also applicable in eastern Oregon.

Roads and Trails

It is anticipated that the existing road and trail system would provide access for range improvement construction. Unimproved trails and tracks would be created to reach construction sites. These trails could continue to be utilized for maintenance of the projects.

Maintenance

Various procedures would be followed to maintain the range improvements. Not all improvements require the same amount of maintenance. Therefore maintenance inspection schedules would be established. Maintenance of some improvements, such as fences, usually would be done by the permittee while most maintenance of reservoirs, springs, pipelines and wells would be the responsibility of BLM.

1.2.2.3 Monitoring and Management Adjustments

In the follow-up actions, each grazing allotment would be studied. These studies include climate, actual use, utilization, and range trend (Appendix C) and would be conducted in accordance with BLM Manuals 4412 and 4413. Other resource studies as appropriate would also be conducted. Results of these studies would be summarized and evaluated at the end of each grazing system cycle. The data would then be used to assess progress toward achieving AMP objectives and to recommend adjustments in the grazing system or stocking rate.

If an evaluation supports an increase in livestock grazing use and the increase is consistant with the MFP, the additional use would first be granted on a temporary basis. An evaluation of forage production must confirm the availability of additional forage before an increase in use would become permanent.

AMPs would be revised if the evaluation procedures determine that the specific objectives established for the allotments are not being achieved. Such revisions may include changes in the grazing system, amount of livestock use permitted, seasons of use, or any combination of these. All AMPs are subject to change any time deterioration of resources is apparent.

1.2.2.4 Further Environmental Assessment Requirements

It is the policy of BLM to conduct an assessment of any action which could have an impact on the environment. Interdisciplinary assessment in accordance with BLM Manual 1791 is flexible, depending on the magnitude of the specific action.

Standard procedure requires preparation of an assessment for every proposed AMP and range improvement project. Similar actions may be grouped into one assessment. Environmental analysis would be completed prior to construction of the proposed range improvement projects.

1.2.3 Less Intensive Management

Less intensive management is proposed for 43 allotments or portions of allotments affecting 18,553 acres of public lands (Table 1-2 and Figure 1-1).

Proposed forage allocation ranges from 5 AUMs to 280 AUMs. These allotments, consisting of small tracts (generally less than 320 acres) intermingled with large acreages of private lands, have little public resource value and/or limited capability for grazing management by BLM. Minor changes are proposed to adjust the livestock use to the present grazing capacity of the public lands in eight allotments (5206, 5519, 5542, 5544, 5546, 5551, 5554, and 5560) with a net downward adjustment of 152 AUMs. Under this proposed type of grazing management, BLM grazing actions would be limited to issuing grazing permits based on the grazing capacity of these public lands. Most of these lands are designated by MFP decision for eventual transfer out of public ownership through private land exchanges. Existing range condition is not available for these lands.

No range improvements are planned on the less intensive management areas.

1.2.4 Driveway

The Driveway Allotment (5319), consisting of 1,680 acres of public land, is located along a county road north of Diamond (Figure 1-1). Cattle have traditionally used this road to reach BLM allotments. Some cattle are allowed to drift while others are driven. Since much of the use is on the county road, no trailing permits have been required. This practice would continue under the proposed action. No range improvements are planned.

1.2.5 Continuation of Unallotted Lands

Unallotted status (no authorized grazing) would be continued on 21,032 acres of public lands as shown on Figure 1-1. No range improvements are planned on unallotted areas.

1.3 IMPLEMENTATION OF THE PROPOSED ACTION

The implementation schedule for intensive management is shown on Table 1-6. The livestock adjustment inherent in the initial forage allocation would be started in the first full grazing season following the filing of the final environmental statement with the Environmental Protection Agency (EPA). The forage allocation and livestock adjustment would be completed within 3 years.

As shown on Table 1-3, the proposed grazing systems are already in effect on 63 allotments (452,747 acres). New grazing systems are proposed for all or part of the 18 remaining allotments (183,697 acres). Table 1-6 shows the range improvements necessary to implement AMPs on the 81 allotments proposed for intensive management Of the needed improvements shown on Table 1-6, 1 well, 39 miles of pipeline, 8 miles of fence, and 3 cattle guards have been constructed during 1977 and 1978. These improvements were constructed to alleviate the effects of the 1977 drought and would be removed if they conflict with subsequent management decisions. Since 1976, there has been no

Range Improvement and AMP Implementation Schedule

Allotments by AMP 1/	Year 1 2/	Year 2	Year 3	Year 4	Year 5
*5101 Devine Ridge 3/	S-1,000		R-3	C-1	Full Implmtn.
*5102 Prather Creek	Full Implmtn.				
*5103 Lime Kiln		R-1;Sp-1	Full Implmtn.		
*5104 Soldier Creek		R-1	Full Implmtn.		
*5105 Camp Harney		R-11;Sp-4;F-3	S-500	C-1	Full Implmtn.
*5106 Cow Creek	Full Implmtn.				
5108 Little Cow Crk.		Sp-4;F-2.5	Full Implmtn.		
*5201 Coleman Creek	S-300;R-3		S-300		Full Implmtn.
5202 Hunter				R-1;Sp-1;F-1	Full Implmtn.
*5203 Catterson			S-200	R-1	Full Implmtn.
*5204 Slocum Field	Full Implmtn.				
*5205 Venator		R-3;Sp-1;S-200			Full Implmtn.
*5207 Coyote Creek				R-1;Sp-1	Full Implmtn.
5208 Emmerson	Full Implmtn.				
*5209 Crane	Full Implmtn.				
*5210 Windy Point					Full Implmtn.
*5212 Mahan Ranch	P-1	S-400			Full Implmtn.
*5217 Thompson FFR					Full Implmtn.
*5211 Beckly Home	Full Implmtn.				
*5213 Beaver Creek		S-725		R-5	Full Implmtn.
*5214 Hamilton	Full Implmtn.				
5215 Davies				F-3	Full Implmtn.
5301 Princeton	P-10.5;W-1;F-6;C-2	Full Implmtn.			
*5302 Big Bird	Full Implmtn.				
5303 Dry Lake 3/	P-13;C-5;S-8,559	S-1,841	P-13;W-2;F-2		Full Implmtn.
*5304 Square Butte	P-1;S-500		S-500		Full Implmtn.
*5305 Crow's Nest	Full Implmtn.				
*5306 Rocky Ford	P-1			C-2	Full Implmtn.
5307 Smyth Creek	R-3;C-2;F2.3	S-2,240			Full Implmtn.
*5308 East Kiger			R-2	Full Implmtn.	
*5324 West Kiger				Full Implmtn.	
*5309 Happy Valley	Full Implmtn.				
*5311 Government Fld.	Full Implmtn.				
*5312 Deep Creek	Full Implmtn.				
*5310 Riddle Mountain	P-1	Full Implmtn.			
*5313 Burnt Flat			P-4;W-1	R-1;C-1	Full Implmtn.
*5314 Summit Springs			R-1	Full Implmtn.	
*5315 S. Fk. Malheur	P-1	S-1,000	R-3;F-2.5		Full Implmtn.
*5316 Virginia Valley	P-7.5;C-3;S-320		S-320		Full Implmtn.
*5321 Hamilton Indiv.	Full Implmtn.				
5501 E.Fk. Cow Creek				R-3;Sp-1	Full Implmtn.
*5502 Rock Creek				Sp-2	Full Implmtn.
*5503 Pine Creek			Sp-7;F-5	R-18	Full Implmtn.
*5505 Little Muddy				R-7	Full Implmtn.
5506 Muddy			R-3;Sp-3;F2.7	Full Implmtn.	
*5507 Wolf Creek				Sp-4;F-1	Full Implmtn.
*5508 Baker Knowles	Full Implmtn.				
*5509 William Dripp Spr				R-3	Full Implmtn.
*5510 Jones Dripp Spr				R-2	Full Implmtn.
*5511 Moffet Table		S-500	R-3;Sp-1;F-3		Full Implmtn.
*5512 Clark's River	Full Implmtn.				
5513 Shelly & FFR	R-5;Sp-2;F-1.5	S-480			Full Implmtn.
5514 Coal Mine Creek	F-0.5;S-320	R-8;Sp-6	S-680		Full Implmtn.
*5515 Mule Creek			R-1;Sp-1;F-1	Full Implmtn.	
*5544 Brooks Field				Full Implmtn.	
*5516 Birch Creek				R-1	Full Implmtn.
*5517 Otis Mountain				R-8	Full Implmtn.
*5523 Hart				R-2	Full Implmtn.
*5518 Newell Field				R-3	Full Implmtn.
*5520 Little Upson					Full Implmtn.
5521 Rocky Basin		R-3;C-2;S-200		Sp-2;F-2.2	Full Implmtn.
*5522 Cottonwood				R-5;Sp-4	Full Implmtn.
*5524 Tub Springs			R-1;Sp-1	Full Implmtn.	
5525 Mill Gulch	R-2;F-2.2	S-200			Full Implmtn.
*5526 Chalk Hills			Sp-1	Full Implmtn.	
5527 Drinkwater Summit			R-3	Full Implmtn.	
*5528 Cooler			S-480;R-4	C-1	Full Implmtn.
*5529 House Butte 3/	R-21;Sp-2;F-1.3;S-1,450		S-1,534	C-1	Full Implmtn.
*5530 River 4/		S-4,205	R-10;Sp-4	C-1	Full Implmtn.
*5564 Wheeler Basin			R-2		Full Implmtn.
*5565 Upton Mountain	F-2;C-1		R-7		Full Implmtn.
*5566 Texaco Basin	C-1		R-2;Sp-7		Full Implmtn.
*5531 Stinkingwater		S-204	R-6;Sp-8		Full Implmtn.
*5532 Mountain				R-10;Sp-10	Full Implmtn.
*5533 Buchanan	Full Implmtn.				
*5534 Mahan Creek			R-2;Sp-5	Full Implmtn.	
5535 Miller Canyon	Full Implmtn.				
5536 Alder Creek	F-12.5		S-1,624;Sp-16	R-23	Full Implmtn.
5537 Buck Mountain		R-14;F-9.5	Sp-6;S-1,000		Full Implmtn.
5538 Riverside		R-8;F-4.0	Sp-6;S-1,000		Full Implmtn.
*5541 Wilber FFR	Full Implmtn.				
Full Implementation -					
Allotments:	18	2	3	10	48
Acres:	36,876	38,476	8,764	47,287	505,041

1/ Dashed lines separate allotments which have been combined into an AMP.
2/ The livestock use adjustments would be initiated in Year 1 and completed within 3 years.
3/ Allotments with proposed brush control.
4/ Includes all proposed projects in Allotments #5564, 5565, 5566.
* No change in the existing system is proposed.

Legend:
S = Seeding (acres) R = Reservoir (number)
Sp = Spring (number) C = Cattle guard (number)
P = Pipeline (miles) W = Well (number)
F = Fence (miles)

change in grazing systems or forage allocation except for temporary adjustments related to the drought in 1977.

All range improvement projects except seedings are normally considered usable the year following completion of construction. In accordance with BLM policy, seedings would not be usable for at least two full growing seasons following planting. Full implementation of AMPs is based on the dates when projects become usable as explained above.

1.3.1 Costs

Allotment management plans and their respective benefit-cost (B/C) analyses are on file in the Burns District Office. The B/C analyses show that 24 AMPs have benefit-cost ratios of 3 to 1 or greater; 5 have ratios between 2 and 3 to 1; 18 have ratios between 1 and 2 to 1; and 21 have ratios less than 1 to 1. The overall B/C ratio for the ES Area would be 3:1.

All cost and benefit data are based on 1976 values. The one-time investment and annual recurring costs of the proposal are listed below:

One-Time Costs	
BLM AMP Preparation	$ 136,000
BLM Range Improvement Projects	1,698,800
	$1,834,800

Annual Recurring Cost	
BLM Administration and Supervision	$ 14,300
BLM Project Maintenance	70,000
Permittee Maintenance	37,500
	$ 121,800

The annual recurring costs are in addition to the costs incurred in maintaining the present level of livestock management and project maintenance of existing improvements.

1.4 INTERRELATIONSHIPS

1.4.1 BLM Planning

The BLM planning system is essentially a decisionmaking process utilizing input from the public and data about the various resources. Land use objectives, decisions and rationale concerning the type and amount of use for each resource category are developed and incorporated into the Management Framework Plan (MFP). The MFP and supporting material are used to develop site specific

activity plans such as AMPs. The current Drewsey MFP, completed in 1978, and background planning documents, are available in the Burns District Office.

A summary of resource use conflicts with grazing in the Drewsey ES area, and the relevant MFP decisions are incorporated in Table 1-7. An example of the interaction between resource management recommendations may be seen in the MFP decision regarding riparian habitat (Table 1-7). These decisions resulted in livestock being excluded from certain riparian areas (Table 1-8, Figures 1-1 and 1-2). Forage production within these excluded areas was not incorporated in the allocation for livestock under the proposed action. The fencing (3.8 miles) needed to exclude livestock from Allotments 5514, 5529, and the Drinkwater Basin area in 5530 is part of the grazing program and is included in the 71 miles described in the proposed action. Approximately 18.5 miles of fence needed to exclude livestock from the remaining areas shown in Table 1-8 are part of the wildlife and watershed programs. However impacts created by all fencing to exclude livestock from the total area (2,660 acres described in Table 1-8) will be discussed in Chapter 3.

Table 1-8

Presently Grazed Areas Proposed for Livestock Exclusion

Figure 1-2 Reference No.	Location	Allotment	Approx. Miles of Fence Needed	Acres	Public Stream Miles
1	Drinkwater Basin 1/	5530	2.0	1,203	
2	Coal Mine Creek 1/	5514	.5	320	1.0
3	Stinkingwater Creek 1/	5529	1.3	360	1.2
4	Warm Springs Reservoir	5530,5566	3.0	400	
5	Mahon Reservoir	5315	2.0	160	
6	House Butte Reservoir	5529	0	60	
7	Reservoir,T21S,R34E Sec 21	5529	1.0	40	
8	Reservoir,T21S,R34E Sec 9	5529	.5	15	
9	Smyth Creek	5307	2.0	36	2.9
10	Riddle Creek	5309	1.0	6	.5
11	Riddle Creek	5310	1.0	6	.5
12	Cottonwood Creek	5322	1.0	6	.5
13	Stinkingwater Creek	5532	2.0	12	1.0
14	Coleman Creek	5536	4.0	24	2.0
15	Paul Creek	5310	1.0	12	.9
	Totals		22.3	2,660	10.7

1/ Fences needed to exclude livestock are part of the proposed action. Rehabilitation would be assessed after 5 years to determine advisability of resumed grazing.

MFP Recommendations, Conflicts and Decisions Affecting the Livestock Grazing Program

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
Produce the maximum amount of forage for grazing by livestock (cattle) by: intensive grazing system management; stocking rate adjustment for systems to be used; and provision for facilities and land treatment to implement systems and improve distribution.	Recreation: 1. Exclude livestock grazing from 1/2 mile strip around Warm Springs Reservoir to prevent livestock damage to shorelands and water quality.	Area has livestock grazing capacity of 83 AUMs & potential with seeding of 750 AUM's & annual personal income of $2,415.	Fence area on west side to be seeded & grazed in manner to provide watershed protection, & place east side area in restricted use pasture. Seeding & better livestock control will improve forage production with no loss of AUMs and will protect recreational quality of shorelands and water.	None
	Primitive & Visual Resources			
	1. Manage 2,080 acres along Middle Fork of Malheur River & Blue Bucket Creek as a roadless area & to protect visual values. Allow cattle grazing only to extent compatible.	Area has rugged terrain with sporadic livestock use, sometimes heavy & other times only lightly grazed — varying between 100 and 350 AUMs,	Approve primitive & visual resources recommendations. Fence area & graze as restricted use pasture at about 100 AUMs with no new improvements. Restricted use is compatible with high environmental values.	Loss of up to 250 AUMs of livestock use by reduction to restricted level of 100 AUMs. 250 AUMs loss of livestock use represents an annual personal income loss of $805.
	2. Manage 6,500 acres in Squaw Lake area for primitive values & to protect visual values. Allow current grazing use to continue with no new developments or improvements.	Area is used by cattle as part of a 36,700 acre allotment with current 4,568 AUMs total livestock use.	Approve primitive & visual resources recommendations because of high scenic, esthetic & primitive values. No developments will be made and forage production will be restricted by less than 1% in this part of the allotment.	None
	Cultural Resources			
	1. Eliminate livestock concentrations around natural water sources (streams & springs) until cultural resource inventories are completed, to insure protection of unidentified archeological sites.	Livestock graze areas along numerous natural water sources, & depend heavily on some for stock water supply.	Approve livestock recommendation. Proposed elimination would create many livestock distribution & control problems including loss of stockwater supply, & only a few areas may have possible archeological archeological values. Suitable livestock adjustment or exclusion will be made when specific archeological sites are identifed.	Some possible loss of archeological values until cultural resource surveys are completed.

Table 1-7 (Cont.)

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
	Wild Horses			
	1. Remove livestock from 260,523 acres embraced in six wild horse herd management areas & allow increase in current 400 horse herd size to a level of some 1750 horses.	Area covers 38% of planning area with current 22,737 AUM's of livestock use representing an annual personal income of $73,213.	Implement wild horse control program at reduced level fluctuating between 200 & 330 with wild horse forage allocations of 3,960 livestock AUMs. Livestock will not be removed from wild horse herd management areas. Reduced number of horses will avoid serious impact on livestock industry and will satisfy BLM responsibility for wild horse protection in viable herds in accordance with PL 92-195.	3,960 AUMs lost to livestock use representing an annual personal income loss of $12,751. Increase in wild horse herd size will not materialize.
	2. Remove all interior fences within wild horse herd management areas & fences between adjacent management areas.	Proposal would severely interfere with livestock management program and necessary allotment fencing to control cattle for rotation & protection of seeded areas.	Reject wild horse recommendation. Fencing will be retained for effective livestock management & control. To the extent compatible with livestock program, gates will remain open seasonally & between pastures to accommodate wild horse movement. Reduced level of wild horse numbers can be maintained within & in conjunction with existing grazing allotments.	Will restrain free movement of horses to a degree and will prevent free exchange of genetic pool.
	Watershed Protection			
	1. Increase to or maintain 60% vegetation & litter ground cover on soils that will support Big Sagebrush; 40% vegetation & litter cover on soils that will support Low Sagebrush; & 20% vegetation & 75% total ground cover on soils that will support stiff sagebrush to reduce soil surface erosion. Pay particular attention to nine identified allotments with pronounced sedimentary soils & to high turbidity & sedimentation problems of the Middle Fork Malheur River adversely affecting Warm Springs Reservoir.	Livestock graze numerous areas where ground cover is inadequate for watershed protection & erosion control. Reduction of 4,602 AUMs in 26 allotments, proposed to bring livestock use in line with grazing capacity, would help improve cover conditions. However, cover deficiency would still remain in some 34 allotments where 5,956 AUMs of livestock forage should be withheld from cattle and retained for protective cover. By 1990, as bare areas are seeded and the total grazing capacity expanded, about 11,069 AUMs livestock forage would be needed for protective vegetative cover.	Adopt watershed recommendation & accomplish by grazing use reduction, seeding bare areas, & vegetative manipulation. BLM has responsiblity to maintain & protect watersheds. This decision is essential to reach a stable erosion condition by combined management & treatment within 15 years.	Initially, 5,956 AUMs of forage will be lost to livestock use with a personal annual income loss of $19,178. By 1990, the loss of potential livestock forage use will be increased to 11,069 AUMs with an estimated $35,642 sacrifice in personal annual income.

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
	2. Remove livestock from the Drinkwater Basin part of River Allotment (5530) and the south part of the Coal Mine Creek Allotment (5514) because of serious erosion problems and lack of protective vegetative cover.	An estimated 70 AUMs of livestock forage use would be affected by this proposal.	Adopt watershed recommendation. Drinkwater Basin portion of the allotment will be fenced to exclude livestock--in conjunction with controlled restricted livestock use of the adjacent river pasture part of allotment. South 320 acre part of Coal Mine Creek Allotment will be fenced and livestock excluded during the rehabilitation process.	Loss of 70 AUMs from livestock exclusion and additional 155 AUMs lost through restricted livestock use. (These losses included in totals for Item 1 above).
	Stream Riparian Habitat			
	1. Remove livestock & fence an area 50 ft. wide on either side of all 65 miles of perennial streams crossing public lands--to maintain protective vegetative cover, prevent disturbance of stream bottoms, & enhance water quality, fisheries & esthetic values	Livestock exclusion from these 786 acres would cause loss of 157 AUMs livestock forage use. Proposal would interfere with livestock distribution system & eliminate stock water supply from certain stream reaches.	Fence 11 miles of stream reaches covering 281 acres & allow grazing use only as needed & appropriate for vegetative manipulation. An additional 11 miles of streams would be included into restrictive use pastures where livestock grazing can be reduced as needed to maintain the desired amount of vegetative cover. No significant loss of livestock forage use should result as adjustments will be made in the overall grazing management system. Necessary vegetative cover & watershed protection will be provided along streams.	Any resulting losses in livestock AUMs probably be offset by gains resulting vegetative condition and production.
	Water Quality			
	1. Fence all major spring sites at stream headwaters & exclude livestock to avoid water quality deterioration & to maintain potable water discharges to stream courses.	Stock water supplies would be eliminated in a number of grazing allotments causing loss of AUMs and stock distribution problems in use of alternative water sources.	Fence only major springs that flow into perennial streams but if other water sources are not available for stock use, provide that water will be piped from enclosed spring area. Water quality & flow volume will be protected at all major spring sites with no reduction in livestock use. These are the sites that will predominantly effect potable water supplies.	None

Table 1-7 (Cont.)

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
	Wildlife			
	1. Provide mule deer forage which will help meet objective of doubling herd size in the planning area by 1990.	About 22% of the total mule deer forage use is type of vegetation consumed by livestock. This proposal would require an initial allocation of 1,033 AUMs livestock forage for deer use and a 2,066 AUM allocation by 1990.	Wildlife recommendation adopted. Where significant conflicts are identified with mule deer forage needs adjustments will be made in individual grazing system allotments. This will help expanded deer herd to optimum size with modest reduction in livestock use.	Initial loss of 1,033 AUMs for livestock with estimated personal annual income loss of $3,326, & loss of 2,066 AUMs by 1990 with annual income loss of $6,653. Estimated increase in personal annual income of this allocation for wildlife/recreation is $2,345 by 1990. Net personal annual income loss by 1990 will be $4,308.
	2. Eliminate cattle use for 5 years on seven identified allotments to improve condition & reduce mule deer forage competition.	Combined livestock use in these allotments total 6,164 AUMs annually representing $19,848 in personal annual income.	These allotments will be placed under rotational use with special attention to deer forage needs. Through adjustment in grazing management systems, much of the conflict may be resolved.	Some loss of mule deer forage is possible in these allotments.
	3. Provide seasonal requirements for antelope forage needs to increase the herd size about 5%.	Some 9% of total antelope forage use is the type of vegetation consumed by livestock. This proposal would require an initial allocation of 145 AUMs livestock forage for antelope use & a 152 AUM allocation by 1990.	Adopt wildlife recommendation. Adverse effects on livestock industry are minimal, & this will offer opportunity to increase antelope numbers to optimum herd size.	Initial loss of 145 AUMs for livestock with personal annual income loss of $467, & loss of 152 AUMs by 1990 with income loss of $489. Estimated increase in personal annual income of this allocation for wildlife/recreation is $16 by 1990. Net personal annual income loss by 1990 will be $473.
	4. Reduce livestock use to 250 AUMs in the Clear Creek seeding pasture and to 270 AUMs in the Stinkingwater seeding pasture during spring use years to lessen livestock--antelope competition for forbs. (5531)	These areas are grazed in alternate years and the proposal would result in an average annual reduction of 378 AUMs livestock use with a $1,217 annual personal income loss.	Adopt livestock recommendation. Adjust spring use to 690 AUMs livestock use in the Clear Creek seeding and 586 AUM's in the Stinkingwater seeding in which one is alternatively grazed while the other is rested. There is no indication that livestock use reduction here is necessary for antelope, and alternative forage sources are available for antelope use.	Loss of some highly preferred forbs for antelope use, although total forage for antelope will be adequate to sustain desired herd size.

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
	5. Remove cattle from along about 1 mile of tributary A - Coleman Creek, 1 mile of Stinkingwater Creek, and 1 mile of Smyth Creek, where riparian cover is in danger of being eliminated causing loss of wildlife habitat & water quality protection for fish.	Proposal would exclude less than 85 AUMs livestock use on about 72 acres but would require grazing system ajustments for access to stock water supply.	Approve wildlife recommendation. Fence and exclude livestock use from the cited areas for riparian habitat protection. Essential riparian cover would be protected for enhancement of wildlife & fish habitat, with additional fencing requirements.	Minor loss of livestock forage use but adjustments are required in the grazing system to insure access to stock water supplies.
	6. Improve waterfowl nesting habitat from present 1" to 3" height of herbaceous species to more than 12" height by excluding livestock from 1155 acres in Dry Lake Field area; 160 acres around Mahon Reservoir; 400 acres around Warm Springs Reservoir; fenced area around House Butte; and areas around two unnamed reservoirs Secs. 9 & 21 T21S, R34E.	Proposal would result in loss of 231 AUMs livestock use in Dry Lake Field area and about 55 AUMs in other areas. These reservoirs, however, are primary sources of stock water in the respective areas and without alternative water supply, proposal would have much greater impact on livestock use and distribution.	Fence areas essential to waterfowl habitat and provide alternative stock water supply either piping from enclosures or creating new reservoirs. In Dry Lake Field area, reduce livestock use by initiation of a 4 year grazing cycle to provide 115 livestock AUMs while increasing waterfowl numbers from 320 to 684. Other fenced pasture areas will have reduced livestock use where necessary for waterfowl habitat enhancement. Minimal livestock losses are offset by improvement in waterfowl habitat.	Initial loss of 167 AUMs for livestock use with estimated personal annual income loss of $537 & loss of 429 AUMs by 1990 with loss of $1,381 in annual income. Estimated increase in personal annual income of this allocation for wildlife/recreation is $200 by 1990. Net personal annual income loss by 1990 will be $1,181. (These trade offs include those for fish and riparian habitat in Item 5 above.)
	7. To improve sage grouse habitat, manage cattle to allow a minimum 6" stubble height of bunch grass within 2 miles of sage grouse strutting grounds Allow reinvasion of brush species in former strutting grounds where brush was removed by fire, treatment, etc.	Almost the entire planning area falls in some type of sage grouse habitat. Proposal would severely affect the seasonal & geographical distribution of livestock in the grazing systems; it would complicate access to stock water supplies; and would reduce livestock forage use by as much as 47,000 AUMs with an annual personal income loss of up to $151,000.	Approve livestock recommendation. Only small percent of strutting grounds and nesting sites have been identified. Winter feed, disease, and climatic conditions affect sage grouse habitat equally as much as cover. Cattle manipulation to attain desirable vegetation height would generally apply only on about 20 percent of the area with cover of grass, crested wheatgrass and annuals whereas in remaining sagebrush areas a varying degree of cover in rotation system would not be in grazing use during the strutting and nesting season. Livestock use and dependent personal income would be heavily impacted.	Sage grouse habitat in a number of areas will not be improved but specific effects cannot be identified.

Table 1-7 (Cont.)

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
	Wildlife			
Control noxious weeds & poisonous plants which reduce livestock forage production and endanger livestock.	1. Allow no insecticides, herbicides or mechanical treatment within the riparian zone & protect vegetation for wildlife habitat, erosion control & water quality preservation.	Noxious weeds & plants, wherever found, are detrimental to range forage productivity & will spread to other areas with serious adverse affects.	Livestock recommendation adopted because of the threat to livestock forage production & from more widespread infestation. Special treatment will be made to control only target species & avoid unnecessary damage to other riparian vegetation.	Minor loss of riparian wildlife habitat.
	Watershed Protection			
Allow wildfire to eliminate Big Sagebrush & Juniper stands which have reached climax species for improved range condition & increased forage production.	1. Maintain vegetation & litter ground cover in sagebrush areas and quickly suppress any uncontrolled fires for erosion control and water quality preservation.	Allowing uncontrolled wildfire will prevent retention of specified protective vegetative cover for erosion control, prevent preservation of riparian zone and other important vegetation for wildlife habitat and watershed protection.	Adopt watershed and wildlife recommendations. Quickly control all wildfire excepting areas that may be designated for burning in the future. Other management practices will be used to improve livestock forage production without the adverse effects of uncontrolled wildfire.	Potential livestock forage production resulting from uncontrolled wildfire will be lost.
	Wildlife			
	1. Suppress and control wildfire within critical deer winter range, areas deficient in vegetation for wildlife habitat, and the riparian zone to protect vegetation for wildlife habitat.	Same as above	Importance of protecting wildlife habitat and maintaining cover to prevent erosion outweighs benefit to forage production by wildfire.	Same as above

Livestock MFP-1	Conflicting MFP-1 Recommendations	Conflicts	MFP-3 Decisions and Rationale	Trade-Offs
	Watershed			
Initiate brush control practices on 173,648 acres Big Sagebrush areas in the planning area for increased livestock forage production.	1. Reduce soil surface erosion by maintaining 60% vegetation and litter ground cover on soils that will support Big Sagebrush.	The majority of the planning area supports Big Sagebrush and about 315,000 acres or 50% of the area has Big Sagebrush cover with less than 60% vegetation and litter ground cover. Big Sagebrush grows on the more productive sites with greatest potential for increase in livestock forage production. This potential is lost if significant areas must remain untreated.	Adopt watershed recommendation. Between now and 1985, do no control on Big Sagebrush except where accomplished for seed bed preparation. Although rapid re-establishment of protective cover after treatment for brush control could assure a reasonable degree of erosion control, the adverse effects of large scale brush control are uncertain. More specific data is needed on areas of critical wildlife habitat where brush control should be avoided. Also, more definite information is necessary to identify those specific areas where brush control can more effectively contribute to increased livestock forage production.	Loss of the anticipated increase of 11,829 AUMs of livestock forage production by 1990 that would have been realized from large scale brush control. This represents and annual personal income loss of $38,089.
	Wildlife 1. Avoid brush control in sage grouse wintering areas and nesting habitat.	A number of sage grouse areas are included in the proposed brush control program for livestock forage production.	Adopt wildlife recommendation, consistent with the decision above, to protect sage grouse habitat.	None in addition to that stated above.
	2. Create edge effect and leave escape cover as part of vegetation manipulation projects. Limit brush treatment to no more than 1/4 mile between cover strips which should be no less than 100 yards wide.	Reduction in potential livestock forage production, but specific amounts cannot be determined until brush control projects are laid out on the ground.	Adopt wildlife recommendation to create edge effect and leave escape cover for wildlife. No Big Sagebrush control will be accomplished between now and 1985 except for seedbed preparation.	None identified in addition to that stated at the beginning of this section.
	Maintain or increase the browse cover for mule deer habitat on the Beaver Table - South Fork Malheur River Area, Otis Mt. Area, and Areas A&B (on the Overlay) where brush control and burning have reduced habitat quality (5213)	Reduces amount of brush control with resulting decrease in AUMs of livestock forage production. An estimated 6,000 acres of brush control was proposed in this area with a potential increase of 107 AUMs livestock forage by 1990.	Adopt wildlife recommendation to maintain or increase browse cover for mule deer habitat in specified areas.	Potential loss of 107 AUMs livestock forage production included in totals given at the beginning of this section.

1.4.2 Federal, State, and Local Government Interactions

During MFP development, a number of governmental agencies were consulted to determine compatibility with their respective plans and interests and to gain assistance in resolution of potential conflicts. The focus of this discussion is on those agencies concerned with the livestock grazing program. The proposed action does not conflict with or affect the plans of local State, or Federal agencies except as noted below.

1.4.2.1 Federal Agencies

Grazing on lands administered by other Federal agencies is not contingent on grazing on BLM. However, each portion is an integral part of the ranchers total operation. In the Drewsey ES area, 19 BLM permittees also have grazing on the Malheur National Forest and 21 have grazing permits on the Malheur National Wildlife Refuge. The proposed reduction in livestock use on public land would result in either a decrease in livestock numbers or an increase in demand for grazing on private or other agency lands. Coordinated planning among the concerned Federal agencies and ranchers is needed to assure that resource conflicts are resolved and management goals of each agency are met. Presently, there are coordinated plans with the Forest Service on three allotments. No coordinated grazing plans exist between BLM and the Malheur National Wildlife Refuge.

In addition to agencies which manage grazing on the Federal range, the Soil Conservation Service (SCS) develops plans for private ranches. Two BLM allotments (5212 and 5516) consisting of 4,398 acres have SCS coordinated plans.

The National Park Service (NPS) is studying the feasibility of a National High Desert Trail through central Oregon. One possible route would cross the Drewsey ES area near Diamond Craters. Coordination has already been initiated by the NPS.

1.4.2.2 State Government

The Oregon Department of Fish and Wildlife (ODFW) owns 1,520 acres along the Middle Fork Malheur River in Allotment 5530. ODFW was consulted prior to developing the proposed AMP. In the past the ODFW has cooperatively funded range improvement projects, such as spring developments, which have high value for wildlife.

The Oregon Department of Water Resources is responsible for water right filings within the State. BLM files for water rights on all major projects such as springs and reservoirs which are proposed for development on public lands.

There is a potential problem with conflicting water rights with the Warm Springs Irrigation District. The district withdraws water from Warm Springs Reservoir for irrigation, and historically has protested to the Oregon State Water Resources Board any applications for water rights filed on the Middle Fork Malheur River drainage above the reservoir. The irrigation district's position is that any diversion and use of water would diminish the amount of water reaching Warm Springs Reservoir. Of the proposed improvements, 139 reservoirs and 66 springs are in the Middle Fork Malheur River drainage.

Under Oregon Senate Bill 100, all counties and cities in Oregon are required to develop and adopt comprehensive plans and land use controls consistent with statewide planning goals and guidelines. The regulating authority is the Land Conservation and Development Commission (LCDC). The relationship of the proposed action is displayed in Table 1-9.

The LCDC has specified that a city or county may have only one comprehensive plan and that it must include the plans of all affected special districts, State, and Federal agencies. Presently Harney County is in the process of reviewing and updating existing comprehensive plans and ordinances for LCDC approval. BLM routinely reviews and comments on draft plans as they are made available.

Table 1-9

Relationship of the Propoaed Action to Statewide (LCDC) Goala

	LCDC GOALS	DISCUSSION
I.	To insure citizen involvement in all phases of the planning process.	Citizen involvement occurred throughout the planning process, including public meetinga in Burna and Portland.
II.	To establish a land use planning process and policy framework as a basis for all decisions and actions.	The Federal Land Policy and Management Act and the Bureau's planning syatem provide such a procesa and framework. The proposed action has reaulted from this proceas.
III.	To preserve and maintain agricultural lands.	The proposed action should not directly affect agriculture but may stimulate additional agricultural production (for hay) over the long term. A major thrust of the proposed action is the continuation and enhancement of livestock grazing in public lands.
IV.	To conserve forest land for forest uses.	The proposed action would not affect forest land or forest uses.
V.	To conserve open space and protect natural and scenic resources.	The range management practices proposed are inherently conservative of open space. The underlying land use plan provides for preservation of natural and scenic resources considered significant. Some others considered of lesser significance would not be preserved.
VI.	To maintain and improve the quality of the air, water, and land resources.	The proposed action and underlying land use plan provided for maintenance of the quality of these resources, through use exclusion from sensitive areas and special management practices elsewhere.
VII.	To protect life and property from natural disasters and hazards.	No natural hazards were identified in the ES area.
VIII	To satisfy the recreational needs of the citizens of the State and visitors.	The underlying land use plan provides for some needs.
IX.	To diversify and improve the economy of the State.	Given the potential of the lands, the land use plan seeks to achieve a balance in the production of economic resources from them. These resources mainly are livestock grazing, wild horses, recreation and wildlife habitat. The proposed range management plan would result in 11 percent reduced livestock grazing initially but an estimated 9 percent increase in the long term.
X.	To provide for the housing needs of the citizens of the State.	The proposed action would not affect housing needs.
XI.	To plan and develop a timely orderly, and efficient arrangement of public facilities and services.	The proposed action would not affect public facilities and service.
XII.	To provide and encourage a safe, convenient and economic transportation system.	The existing transportation system would be maintained.
XIII	To conserve energy.	Conservation and efficient use of energy sources are objectives in all BLM activities.
XIV.	To establish urban growth boundaries.	The establishment of urban growth boundaries would not be affected.

2

CHAPTER 2

Description of the Environment

2. DESCRIPTION OF THE ENVIRONMENT

This chapter addresses the environment as it exists today within the Drewsey Environmental Statement Area (ES area) and provides a basis on which impacts of the proposed action may be assessed. Only those elements of the existing environment which might be affected are described in detail. Peripheral environmental data are included only to the extent necessary to provide a basis for analysis. Environmental elements which are not affected (such as mining, transportation) are not discussed. Since grazing has occurred within the area for several decades, the environment described generally exhibits the effects of human use.

The future environment without the proposed action is considered to be the environment that would result from continuation of the existing grazing program. Continuation of that plan and the environment that would result are addressed as the "no-action" alternative in Chapter 8.

In preparation of this chapter the primary data sources are documents of the Bureau planning system developed for the Drewsey Planning Area. The Unit Resource Analysis, Planning Area Analysis and Management Framework Plan for the Drewsey Area are available for review at Burns District Office, 74 South Alvord Street, Burns, Oregon 97720.

Other references supplementary to or updating planning system data are cited within the body of the text by author and date of publication. A listing of these references appears in References Cited.

2.1 CLIMATE

The Drewsey ES area has a semi-arid climate, with long, cool, moist winters, and short, warm, dry summers.

The area has a winter precipitation pattern, with about 53 percent of the annual total occurring during the months of November through March. Much of this comes as snow, especially in December and January. The months of July, August and September are generally quite dry.

Precipitation tends to be elevation-dependent, ranging from around 8 inches at the lowest elevation at Warm Springs Reservoir (3,400 feet) to 20 inches at elevations above 5,500 feet.

Temperatures below zero occur nearly every winter, and summer temperatures over 100°F are not uncommon. Freezing temperatures at night may be expected during any month of the year. Daily maximum and minimum temperatures (diurnal variation) fluctuate widely because of an abundance of sunshine, cloudless skies, low relative humidities, and high altitude. Table 2-1 shows precipitation and temperature data for representative stations.

Table 2-1

Temperatures and Precipitation for Selected Stations

Station	Elevation (feet)	Temperatures (°F) Average Annual	Average January	Average July	Precipitation (inches) Average Annual	November-March	July-Sept.
Burns	4,151	46.0	25.2	69.4	11.83	7.02	1.22
Malheur Refuge	4,109	46.4	26.9	67.4	9.07	4.45	1.07
Warm Springs Res.1/	3,336	49.2	26.3	72.7	8.33	4.23	0.95

1/ Station discontinued

Source: U.S. Department of Commerce, NOAA 1965; 1976

Prevailing winds in the area are from the west. In the summer, easterly flows of dry air result in high temperatures and very low humidities. Winter storms approach the area generally from the northwest. During the summer, convection conditions cause thundershowers. These cloudbursts can cause severe soil erosion and flood damage. The most destructive storms, however, are those called chinooks. During late winter or early spring a warm front can sweep into the area bringing rain instead of snow. The warmer temperatures bring sudden snowmelt over the still frozen ground. This melt, along with the rain, can cause severe flood damage due to the overland flow.

2.2 AIR QUALITY

The Drewsey ES area lies within the Eastern Oregon Intrastate Air Quality Control Region (IAQCR). There are no air monitoring stations in the area. The station closest to Burns is at Baker, Oregon, 100 miles to the northeast.

Suspended particulate is the only pollutant exceeding State air quality standards in the IAQCR. This is not due to industrial sources but to wind-blown dust (Oregon Department of Environmental Quality 1975). During the winter, inversions often occur over the Harney Basin, trapping smoke and dust, until strong winds move the pollutants out of the valley.

2.3 GEOLOGY AND TOPOGRAPHY

The ES area lies within three physiographic provinces with the Blue Mountains Province bordering the area on the north. The High Lava Plains Province consists of a volcanic upland that extends from the eastern margin of the Harney Basin to the Cascade Range. The Owyhee Uplands Province reaches from the Stinkingwater Mountains east to the Snake River and consists of a plateau developed on volcanic rocks associated with older sedimentary rocks. The southern part of the area is in the Basin and Range Province, which is

characterized by fault block mountains enclosing basins with internal drainage (Franklin and Dyrness 1973). Figure 2-1 illustrates physiographic provinces.

2.4 SOIL

Two soil surveys cover the ES area: "Oregon's Long-Range Requirements for Water, Appendix I-10, I-12" (Lovell et al. 1969; Lindsay et al. 1969) covers all of the ES area, and "Soil Inventory of the Drewsey-Van-Stinking Water Area Near Burns, Oregon" (Pomerening et al. 1974) covers about 20 percent of the area. A summary of the soil mapping units, their properties, and their acreages as described in the inventories, appears as Appendix D. Information on soil productivity is taken from Pomerening et al. (1974) and is shown in Table 2-5, Forage Productivity.

2.4.1 Associated Soil Groupings

The ES area has been divided into three broad soil groupings, based on physiography. These are basins and valleylands, plains and plateaus, and mountainous uplands. These groupings are split into several divisions as shown on Figure 2-2, General Soils. Location of soil groups relevant to allotments may be seen by comparing Figure 2-2 with Figure 1-1. Appendix D contains a list of soil units within the mapping divisions.

2.4.1.1 Basins and Valleylands

This grouping consists of alluvial bottomlands, basin terraces, lakebeds, and older terraces. The bottomlands and lakebeds have soils that are deep and range from well drained to wet and poorly drained, depending on their position on the landscape. Basin terraces have alkali soils with impeded drainage. Older terraces have shallow soils with cemented hardpans.

2.4.1.2 Plains and Plateaus

Most of the ES area is in this grouping, and consists of soils derived from volcanic flows in the High Lava Plains and Basin and Range Provinces, and lacustrine (lakebed) sediments in the Owyhee Uplands Province (Figure 2-1). The volcanic soils are light colored, very stony, and shallow. The soils derived from lacustrine sediments are fine textured, non-stony, and moderately deep. Due to their fine texture, lacustrine soils have higher rates of natural erosion than the volcanic soils.

2.4.1.3 Mountainous Uplands

The soils on the higher elevation shrub-grasslands are shallow, stony, and dark colored, reflecting an increase in moisture and vegetation density.

2.4.2 Erosion

In the ES area, soil loss occurs from both water and wind erosion. Water is the major agent causing erosion in the area. Langbein et al. (1958 Cited by Mattison et al. 1977) found semiarid regions (9-12 inches of annual precipitation) had the greatest potential for erosion, since there was sufficient rainfall for soil movement but not enough to support a continuous vegetative cover. Wind erosion is less significant in the ES area and occurs mainly on sandy, level soils (Soil Units 6 and 51) around Malheur Lake that have been bared of vegetative cover.

Erosion in the ES area was determined by measuring soil surface factors (SSFs) during Phase I of BLM's Watershed Conservation and Development inventory (see Appendix B-2 for methodology). The SSF rating obtained for each area sampled falls into one of five erosion condition classes. The erosion condition class is a measure of an area's present state of erosion. Erosion rates are generally low, as shown in Table 2-2. Table 3-7 shows erosion condition class acreages by allotment.

Table 2-2

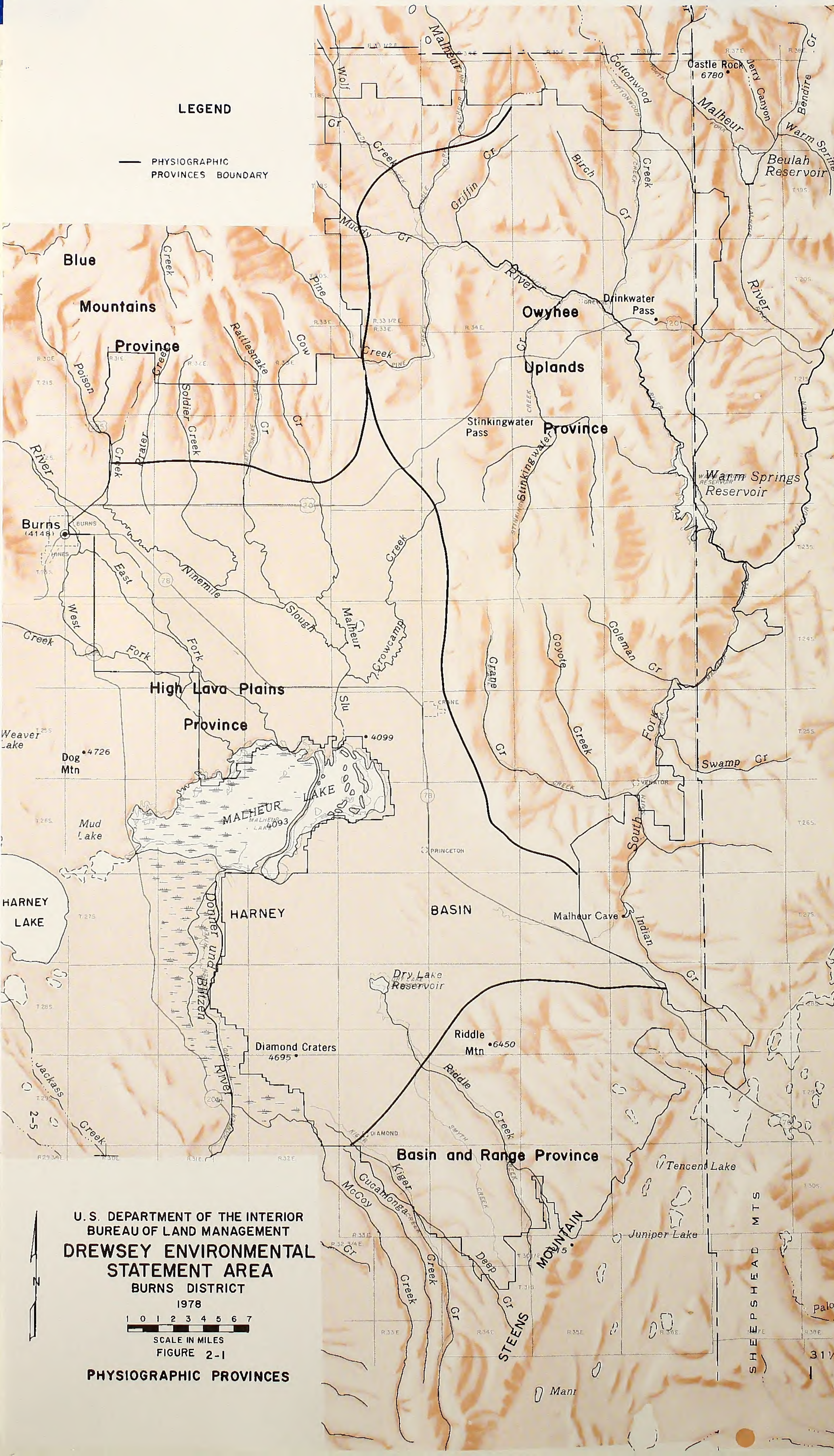
Summary of Present Erosion Condition

Erosion Condition Class	Present Condition (acres)	(percent)
Stable	197,154	31.5
Slight	373,069	59.5
Moderate	49,105	7.8
Critical	5,488	.9
Severe	1,675	.3
	626,491	100.0

Source: USDI, BLM 1976

Erosion problems are the most critical in sedimentary soils (soil divisions alluvial, basin terraces and lakebeds, older terraces, and lacustrine as shown on Figure 2-2). Where the soil surface is exposed, rills and gullies cut quickly in the fine textured soils and gullies can get very deep. The allotments with the most severe gully problems are in 5530 River (Drinkwater Basin area) and 5514 Coal Mine Creek. Many streambanks in sedimentary soils are vertical, apparently due to the high amount of silt in the soils, and continued undercutting of the streambanks by water leads to sloughing of the sides, which increases erosion.

High rates of natural geologic erosion take place on sedimentary soils with a high content of diatomaceous earth. These naturally bare areas are especially subject to erosion because the soils have low cohesion (do not hold together well), support a sparse vegetative cover, are low in organic matter, and generally occur on steep slopes (20 percent or greater).



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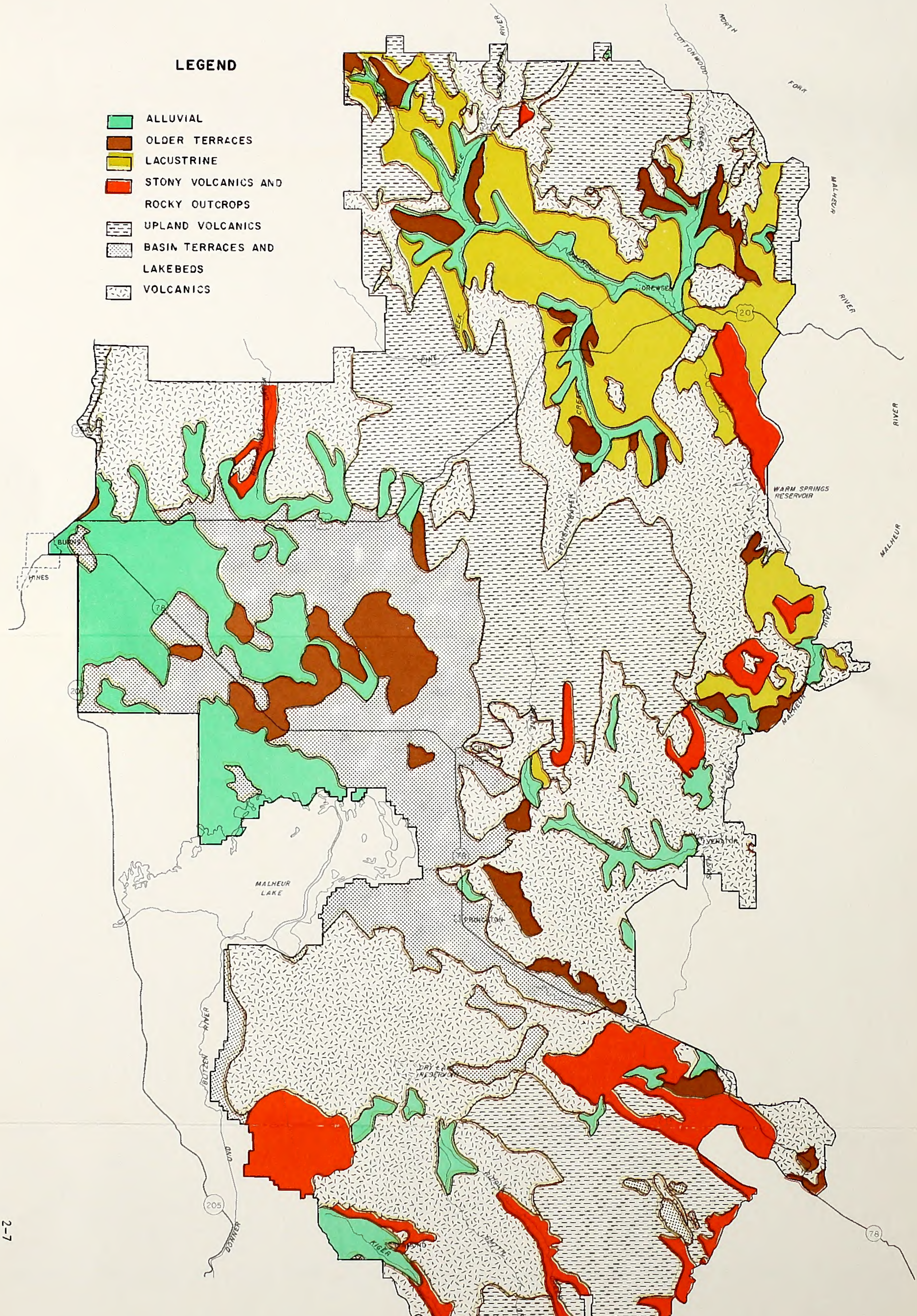
SCALE IN MILES

FIGURE 2-1
PHYSIOGRAPHIC PROVINCES



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1 0 1 2 3 4 5 6 7

SCALE IN MILES

FIGURE 2-2

GENERAL SOILS

It is estimated that streambank erosion contributes 50 percent of the sediment in the streams of the area (see 2.5.2 Water Quality), sheet erosion 35 percent, and gully erosion 10 percent, with 5 percent coming from miscellaneous sources.

2.5 WATER RESOURCES

The water resources of the ES area lie within two major watersheds: the Great Basin watershed drains 52.9 percent of the area while the Malheur River watershed drains 47.1 percent. Most of the perennial streams in the area originate in the Blue, Stinkingwater, or Steens Mountains. The major perennial streams of the area are shown in Figure 2-1.

The two major drainages in the Malheur River watershed (a tributary of the Snake River) that lie within the ES area are the Middle and South Forks of the Malheur River.

Malheur Lake, a large freshwater marsh, is the sink for streams in the Great Basin watershed. Streams spread out quickly once they leave the foothills and either seep into the ground or enter any one of a number of small sloughs found in the flat Harney Basin and Diamond and Happy Valleys.

2.5.1 Runoff

Runoff is that part of precipitation, as well as any other flow contributions, which appears in surface streams, either perennial or intermittent (Chow 1964). There are three basic components of runoff: overland flow, subsurface flow, and groundwater flow. Overland flow moves over the land surface to stream channels, subsurface flow moves laterally through the upper soil horizons toward streams, and groundwater flow moves from deep water saturated zones to streams.

Snowmelt in spring and early summer provides the major part of runoff for perennial streams. During the remainder of the year, groundwater is the major contributor to runoff. Most of the streams in the area, however, are not perennial but intermittent, and flow only for brief periods as a result of snowmelt in the spring or rainfall in which the intensity exceeds the capacity of the soil to absorb water (Branson et al. 1972).

Annual water yields from the area vary greatly, but usually range from 1 to 5 inches per acre. The total annual yield from the ES area averages a total of 204,944 acre-feet or 0.15 acre-feet per acre (Pacific Northwest River Basins Commission 1970, Appendix V).

2.5.2 Water Quality

Field observations by district personnel indicate that water quality problems in the ES area come almost entirely from non-point sources of pollution and

irrigation return waters. Organic material and sediment are responsible for increased turbidity and coliform organisms. The amount of the pollutants depends on land management practices and the intensity and duration of overland flow.

According to the Oregon Department of Environmental Quality (ODEQ 1976a, 1976b), the instream water quality in the Malheur River and Malheur Lake (Great Basin) drainages generally meets the established general standards for the State with the following exceptions:

1. Water temperature - temperatures above 64°F are common from June to October as a result of solar heating, often on diminishing flows. Overland flow from excess irrigation and lack of streambank vegetation may also increase water temperature.

2. Dissolved oxygen saturations - the standard of 6 milligrams per liter (mg/l) is generally met except during low, stagnant flows.

3. Turbidity - turbidity levels in the Malheur River drainage are related to the numerous cloud free days, causing an excessive growth of algae. Turbidity during periods of rain or snowmelt is mainly caused by eroded silt. Irrigation return flows add silt, algae and dissolved solids to streams.

4. Coliform bacteria - the generally high coliform concentrations seem to be due to irrigation return flows and cattle manure.

5. pH - the instream standard of 6.5 to 8.5 is generally met in the Malheur Lake drainage except during summer stream stagnation periods when algal activity drives the pH above 8.5. The Malheur River system waters are naturally alkaline and algal blooms may cause rises above 8.5.

Table 2-3 shows the ranges for temperature, dissolved oxygen, and pH for five stations in or near the ES area. Due to the remoteness and small population of the area, ODEQ has taken only 27 samples from the stations between 1965 and 1977. These are statistically too few samples to be able to draw adequate conclusions.

Approximately 37 percent of the soils in the Middle Fork Malheur River watershed in the ES area above Warm Springs Reservoir are derived from lacustrine sediments and are highly susceptible to erosion. Warm Springs Reservoir was constructed in 1919 with a sediment storage area of 1,000 acre-feet. A survey of the reservoir in 1955 showed the storage area to be completely full of sediment, indicating the severity of upstream erosion. Observations indicate that the primary water quality problem in the watershed is sedimentation, which occurs during peak runoff periods: spring snow melt, rain or snow during the winter, and periodically during the summer following intense thunderstorms. The major part of the sediment in the watershed comes from public and private lands below the National Forest boundary.

Sediment yield data for the ES area were gathered in 1975-76 using a BLM adaptation of the Pacific Southwest Inter-Agency Committee (PSIAC) method (see Appendix B3 for methodology). The average sediment yield for the ES area is 0.232 acre-feet per square mile per year, resulting in a total sediment yield of 227.4 acre-feet per year. This is comparable to sediment yields of less than 0.1 acre-feet per square mile per year in the Great Basin watershed and 0.1 to 0.2 acre-feet per square mile per year in the Malheur River watershed as estimated by the Pacific Northwest River Basins Commission (1970). Sediment yield by allotment is shown in Table 3-8.

Table 2-3

Range of Selected Water Quality Parameters

	Temperature (°F)	Dissolved Oxygen (mg/l)	pH	Number of samples
Malheur River at Hwy 20	53.6 - 75.2	5.7 - 10	7.9 - 8.0	3 (1971-1977)
Malheur River at Drewsey Rd. Br.	56.3 - 69.8	8 - 10	7.9 - 8.6	3 (1971-1977)
Silvies River east of Burns	39.2 - 72.5	6 - 11	7.4 - 8.3	7 (1965-1968)
Blitzen River at Frenchglen	41.0 - 71.6	6.7 - 11.6	7.5 - 8.4	7 (1965-1968)
Blitzen River at Diamond Rd.	39.2 - 71.6	4.9 - 10.7	7.0 - 8.3	7 (1965-1968)

Source: ODEQ 1978. Unpublished computer printout.

Water quality in reservoirs, particularly stock water reservoirs, is poor due to algal blooms and suspended sediment.

The only information available on streams and streambank conditions is a fisheries survey, which is summarized under Table 2-10.

2.5.3 Groundwater

The ES area is underlain by alluvial deposits and volcanic and sedimentary rocks capable of yielding moderate to large water supplies at rates of 100 to 2,000 gallons per minute (Pacific Northwest River Basins Commission 1970, Appendix V). Large quantities of ground water (an estimated 15,000 acre-feet

in 1969) are withdrawn by several hundred wells in the Harney Basin (Leonard 1970). Lesser quantities are withdrawn elsewhere. The general direction of movement of groundwater is from upland recharge areas toward valley areas. Recharge in the uplands is chiefly by direct infiltration of precipitation, and locally along streams by infiltration of stream flow during periods of high runoff (Gonthier et al. 1977).

Groundwater quality is generally good, especially in the upland areas. Dissolved solids are less than 500 mg/l, the maximum concentration recommended in drinking water by the U.S. Public Health Service (Leonard 1970). However, in the Harney Basin the groundwater quality deteriorates toward Malheur Lake: near the lake the water is so mineralized from boron, sodium, and other dissolved solids that it is unsuitable for use for domestic, irrigation or stock watering purposes. Several wells yield water over 1,000 mg/l dissolved solids (Ibid).

2.5.4 Water Use

On public lands in the ES area, water is used mainly by livestock and wildlife. Consumptive water use by livestock is 70.3 acre-feet per year, based on 300 gallons per AUM (Stoddart, Smith and Box 1975). The sources of water are streams, reservoirs, springs, and wells. Existing water developments are shown on Figure 1-1.

Water on private land, used mainly for irrigation, is obtained from spring runoff, wells, and reservoirs. At the present time, there is no industrial use of water in the ES area. All water for domestic use is obtained from wells. Fishing is the major recreational use of water. In both the Great Basin and the Malheur River drainages the average annual consumption of water is only half the maximum legal water rights, because legal rights exceed the annual water yield (Oregon State Water Resources Board 1967, 1969).

2.6 FIRE

2.6.1 Wildfire Occurrence

Approximately 70 percent of fire starts in the past 15 to 20 years was caused by lightning, while the remaining 30 percent was caused by debris burning, equipment use, smoking, and railroads. There have been, on the average, 12 fires per year, which burned from less than 1 acre in 1971 to a high of 42,825 acres in 1961. The number of acres burned in any one fire is very variable, and is dependent on weather conditions (wind, humidity, temperature), slope, and the amount of dry, flammable vegetation present. Strong winds, for instance, can spread fire very rapidly through sagebrush plant communities, particularly big sagebrush. Because of the higher density of vegetation in that community, fire control can be very difficult.

2.6.2 Fire Protection

The fire season generally begins in April and ends in November. Fire protection is provided by the Burns District Fire Management Officer and a summer fire crew of 24 people. The U.S. Forest Service and BLM's Burns District provide each other mutual aid along the north boundary of the ES area. Mutual aid is also provided by BLM's Vale District to the east.

2.7 VEGETATION

2.7.1 Vegetation Communities

There are few data about location or composition of the potential vegetation communities within the ES area. The potential vegetation community is the type and amount of vegetation that would grow on an area in the absence of abnormal disturbances such as livestock grazing, rangeland seeding, brush removal, etc. The existing vegetation in the ES area is a result of these disturbances, plus wildfire, to the potential vegetation community. Based upon the existing vegetation communities (Figure 2-3 and Table 2-4) and comparison with adjacent areas, it appears that approximately 96 percent of the area potentially would be dominated by or have a significant portion of one of the following sagebrush species: big sagebrush (70 percent), low sagebrush (21 percent) and stiff sagebrush (5 percent). The remaining 4 percent of the ES area consists of a number of small areas on which the potential vegetation ranges from riparian species in the drainages to forest plants on the upper elevations.

In general, although most plant communities are now in good or fair range condition, they have fewer plants palatable to livestock than they are capable of supporting. The big sagebrush and riparian communities, which potentially have the highest proportion of palatable species and are readily accessible to livestock, probably have been modified the most by livestock grazing and fire.

The other potential communities (low sagebrush, stiff sagebrush, greasewood and ponderosa pine) have been changed to a lesser degree either because they are less accessible, or because fewer of the plants in the community are palatable to livestock.

Based upon the kind of vegetation now found on the potential riparian and big sagebrush communities, it appears that these areas have a significant capability for improvement. Conversely the other communities have less capability for improvement.

2.7.1.1 Riparian Vegetation

The riparian community is estimated to cover 730 acres (0.1 percent) in the ES area (see Figure 2-4, Table 2-4). Since no vegetation surveys have been

Table 2-4

Vegetation Communities

Potential Vegetation Community	Present Vegetation Community	Acres	Percent of Total	Common Associated Species[1]	Community Characteristics
Big Sagebrush	Big Sagebrush	285,602	41.9	Rabbitbrush, buckwheat, Sandberg bluegrass, squirreltail, needlegrass, bluebunch wheatgrass, Idaho fescue, aster, lupine, phlox, squaw apple, bitterbrush.	Occurs on soils over 12 inches deep. Commonly associated with either bluebunch wheatgrass on drier south-facing slopes or Idaho fescue on more moist north slopes. Precipitation varies between 8 to 18 inches annually.
Big Sagebrush	Perennial Grasses	53,711	7.9	Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass, squirreltail, needlegrass.	Found on areas formerly dominated by big sagebrush, which were burned by wildfire or chemically treated to eradicate sagebrush.
Big Sagebrush	Crested Wheatgrass	68,471	10.0	Yellow sweetclover.	Occurs on areas formerly dominated by big sagebrush which were seeded following wild fire.
Big Sagebrush	Annual Grass	7,927	1.2	Cheatgrass, onion, peppergrass.	Found on areas formerly dominated by big sagebrush which were altered by fire and/or extremely heavy grazing. Precipitation varies between 8 to 15 inches annually.
Low Sagebrush	Low Sagebrush	104,873	15.4	Idaho fescue, Sandberg bluegrass, bluebunch wheatgrass, squirreltail, lupine, balsamroot, phlox.	Found on stony soils which have a restrictive layer located between 8 and 18 inches beneath the soil surface. Precipitation varies between 13 to 18 inches annually.
Stiff Sagebrush (shallow soil)	Stiff Sagebrush (shallow soil)	33,061	4.9	Sandberg bluegrass, squirreltail, bighead clover.	Occurs on very shallow (2 to 8 inches deep) soil over bedrock.
Stiff Sagebrush (bedrock)	Stiff Sagebrush (bedrock			Sandberg bluegrass, squirreltail, Idaho fescue, bluebunch wheatgrass, onion, biscuitroot, buckwheat.	Found on very shallow soils over fractured bedrock or rubble. Precipitation varies from 8 to 13 inches.
Big Sagebrush on deep soil areas. Low Sagebrush on shallow soil areas.	Juniper	96,113[2]	14.1	Big sagebrush, low sagebrush, Idaho fescue, Sandberg bluegrass, bluebunch wheatgrass.	Occurs as an overstory in nearly all communities except stiff sagebrush (bedrock) community. Typically found on escarpments and rock outcrops with sparse plant cover, in a belt below the forests to the north, on the Stinkingwater Mountains, and the Steens Mountain foothills.
Greasewood	Greasewood	8,099	1.2	Basin wildrye, saltgrass, squirreltail.	Occurs on deep, level sedimentary soils with high concentrations of salts around Malheur Lake.
Ponderosa Pine	Ponderosa Pine	6,337	0.9	Idaho fescue, bluebunch wheatgrass, bitterbrush, Douglas-fir, yarrow.	Found along the northern boundary of the area above 5,000 feet on sites receiving more than 13 inches annual precipitation. Douglas-fir occurs on the highest elevations and north facing slopes where extra moisture is found.
Riparian	Riparian	730[3]	0.1	Willow, Alder, Kentucky bluegrass, baltic rush, Nebraska sedge, smooth brome, quaking aspen, mat muhly, knotweed.	Vegetation is associated with permanent water. Understories vary from nothing to dense herbaceous stands.
	Diamond Craters[4]	16,656	2.4	Big sagebrush, phlox, mosses.	Very sparse vegetative cover on this recent lava flow. Big sagebrush grows in deep soil in open cinders. Phlox and mosses grow on fractured rock.
	TOTAL	681,580[5]	100.0		

1/ Scientific names for the plants listed are in Appendix E.
2/ Juniper occurs as an overstory layer on 58,017 acres Big Sagebrush and 38,096 acres Low Sagebrush Communities.
3/ Includes 300 acres around Dry Lake, 100 acres around Warm Springs Reservoir, 30 acres around 300 springs (based on one-tenth acre per spring), and 300 acres along streams (based on 4 acres per mile along 75 miles of perennial streams).
4/ Not a distinct vegetation community (recent lava flow), but of sufficient size to map out.
5/ Includes 3,871 acres of Bureau of Reclamation land administered by BLM.

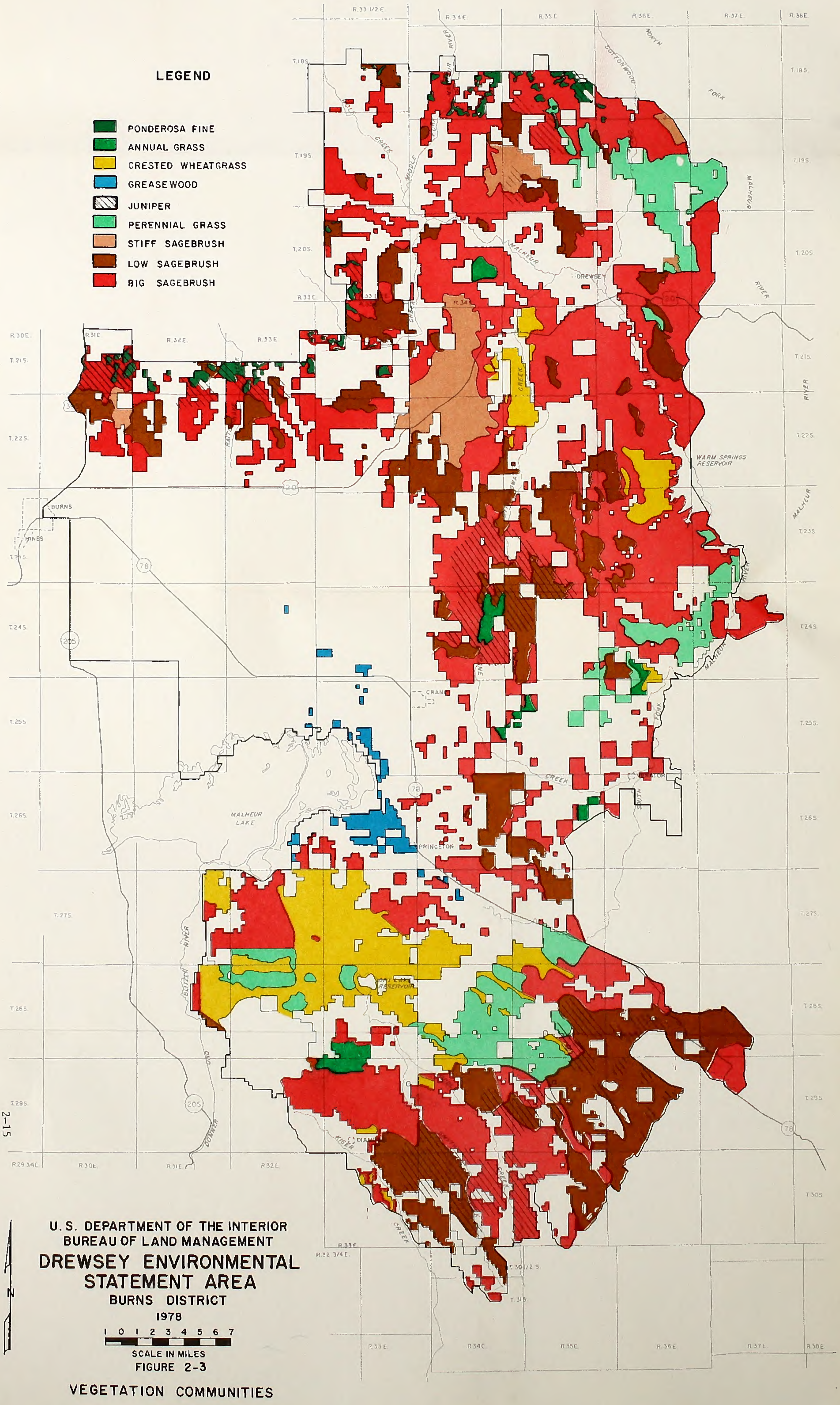

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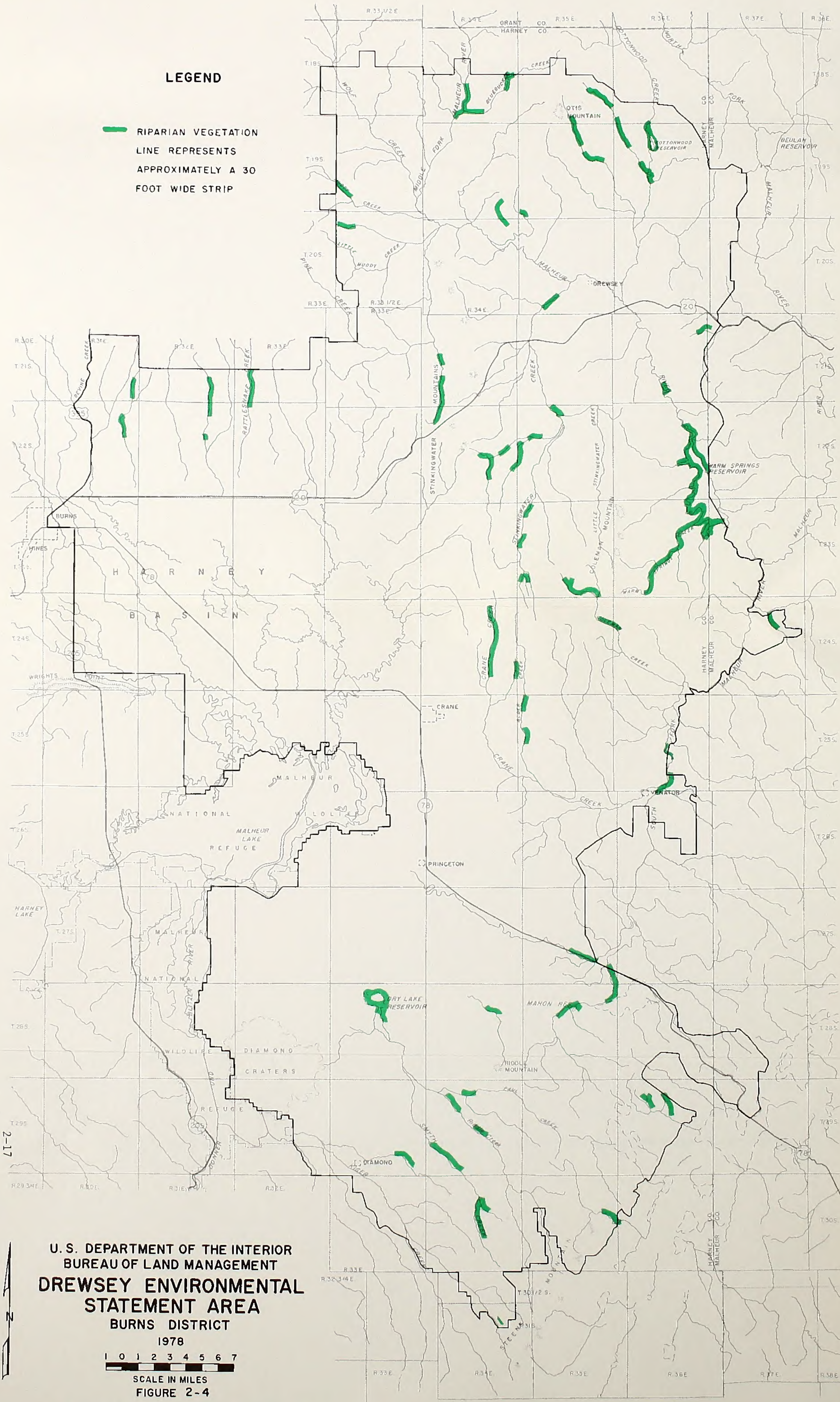
FIGURE 2-3

VEGETATION COMMUNITIES



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SCALE IN MILES

FIGURE 2-4

RIPARIAN VEGETATION ON PUBLIC LAND

completed, the vegetation composition, condition, and production of this community are not known.

Because riparian zones are associated with water and the vegetation stays green longer, they have historically been subjected to concentrated livestock grazing. In most areas, observation indicates that woody species have been eliminated or reduced and many herbaceous species palatable to livestock are in poor vigor. Often this community is dominated by species relatively resistant to grazing because these species reproduce vegetatively or are unpalatable to livestock. As a result, the present vegetation community has a smaller proportion of palatable species than would be found in the potential community.

2.7.1.2 Seedings

Approximately 68,500 acres of crested wheatgrass have been seeded in the ES area, mostly on burned areas that were previously dominated by big sagebrush.

In addition to the former sagebrush communities, there are a number of areas which were virtually devoid of vegetation which were successfully seeded. Prior to seeding, these areas were similar to the 5,205 acres proposed for seeding in Allotments 5530 and 5538. An example of a successful seeding on this type of area can be found west of Warm Springs Reservoir.

The majority of all these seedings were successfully established and past use has shown that forage production was increased from approximately 25 acres per animal unit month (ac/AUM) to an average of 5 ac/AUM. An analysis of past seedings indicates the seeding success is determined primarily by the season and method used. Overall, late summer or fall seeding with a rangeland drill has been most successful.

2.7.2 Forage Production

Forage production by allotment in the ES area is shown on Table 1-2 as Total Available AUMs. Forage production is that portion of the total vegetation that can be removed annually by livestock without causing damage to the grazed plants (forage carrying capacity). The methodology used for determining the forage production is outlined in Appendix B5. Forage production is not synonymous with total vegetation production, which includes all vegetation produced during the growing season.

Within the ES area, forage production is typically 30 percent or less of the total vegetation production. Figure 2-5 is an example of the relationship between forage production and total vegetation production.

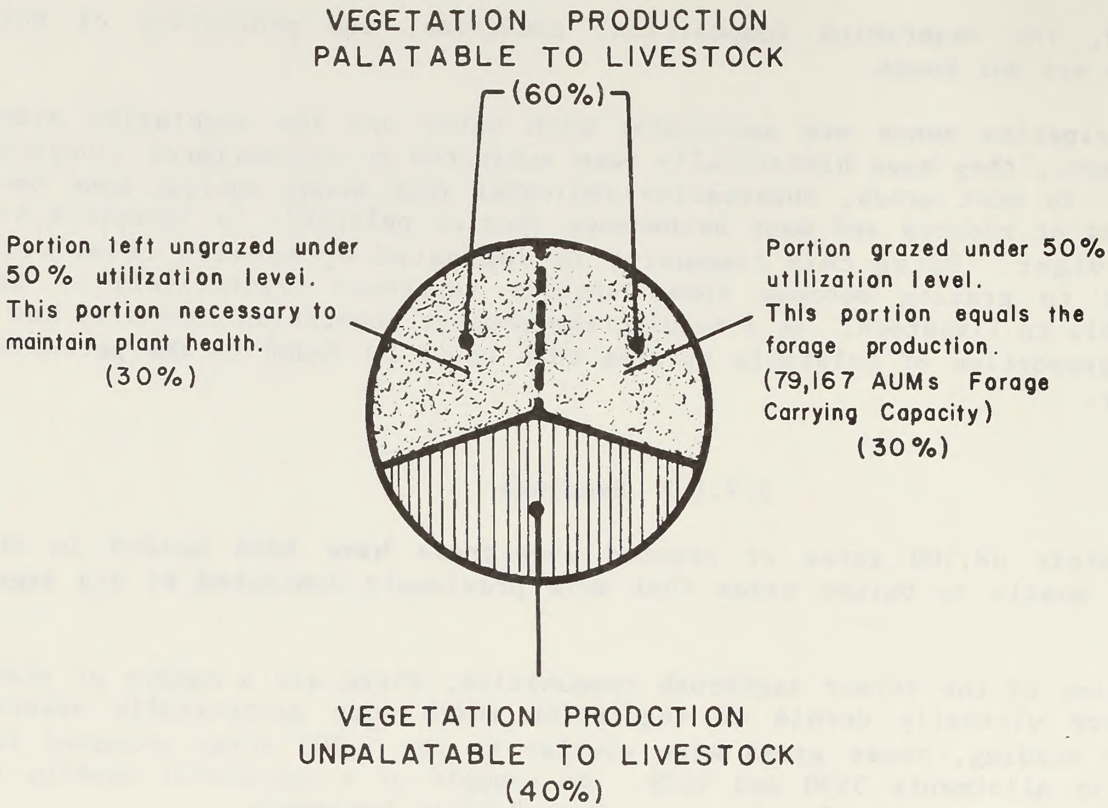


Figure 2-5 TOTAL ANNUAL VEGETATION PRODUCTION

As shown in the example, 60 percent of the total vegetation is palatable to livestock. The rest (40 percent) is unpalatable. In order to maintain plant health only half (50 percent utilization) of the palatable vegetation production would be grazed. As a result, the forage production amounts to 30 percent of the total annual vegetation production.

There can be considerable variation in the portion of the total annual production that can be grazed depending upon the grazing system employed and the vegetation community being grazed. For example, in a successful crested wheatgrass seeding, the forage production is a considerably larger portion of the total vegetation production than in the above example. Normally, 80 percent or more of the vegetation production is palatable, and under a two-pasture rest rotation system up to 80 percent of the palatable species would be grazed. As a result, approximately 65 percent (80 percent utilization X 80 percent palatable species = 64 percent forage production) of the total vegetation would be considered usable forage production. On the other hand, in a dense sagebrush community with very few palatable understory species, forage production would be only 10-15 percent of the annual vegetation production.

Additional information on forage production is available in a 1974 soil survey (Pomerening et al. 1974) that covered a portion of the ES area. This information is summarized on Table 2-5.

Table 2-5

Forage Productivity

Soil Division1/ (Soil Units)2/	Acres3/	Annual Forage Production (lbs/acre) by Ecological Condition Class: Excellent	Good	Fair	Poor	Maximum Forage Production (lbs/acre)
Alluvial						
(1)	45,350	1,200-1,500	1,000-1,200	800-1,000	100-800	1,500
(10)	27,450	500-1,000	400-800	300-500	200-300	1,000
Older Terrace						
(55)	18,400	400-800	300-700	200-600	100-200	800
(56)	9,900	400-800	300-700	200-600	100-200	800
Lacustrine						
(60)	102,800	650-1,050	400-800	275-500	150-250	1,050
Volcanics						
(75)	182,950	200-350	100-250	50-150	20-75	350
(76)	144,050	275-550	150-250	70-200	25-100	550
(77)	84,500	100-200	75-100	50-75	10-50	200
Upland Volcanics						
(82)	23,850	400-800	300-700	200-350	50-200	800
(83)	164,400	500-900	400-700	150-500	100-300	900
(84)	111,550	100-150	50-100	25-50	10-30	150

1/ Soil divisions as shown on Figure 2-2 General Soils.
2/ See Appendix D for a description of soil units.
3/ Acreage includes both private and public lands within the ES area.

Note: The Pomerening report only covers 20 percent of the ES area. The information for the soil units shown has been projected for those units on the remainder of the ES area.

Source: Pomerening et al. 1974

2.7.3 Range Condition and Trend

Range condition is used to describe the productivity of a range area based on the percent of desirable plant species (primarily grasses) available for cattle and on the area's erosion condition. Range trend is a determination of whether the range is improving, remaining static, or deteriorating in condition.

The data used to determine range condition and trend were gathered in 1975 and 1976 using a variation of the Phase I, Watershed Conservation and Development method. See Appendix B6 for condition and trend methodologies.

Table 2-6 gives vegetative condition and trend by allotment. About 8 percent of the public lands were not covered in the 1975-76 survey. These were mainly allotments under less intensive management. Figure 2-6 shows range condition and trend by Phase I Survey areas. Of the 626,491 acres surveyed, 50 percent is in good condition, 47 percent in fair, and 3 percent in poor condition. Approximately 47 percent is in upward trend, 46 percent static, and 7 percent in downward trend.

2.7.4 Threatened and Endangered Plants

Table 2-7 lists proposed threatened and endangered plants expected to occur in the ES area. A survey of the area in 1976 did not locate any known threatened or endangered species; however, 1976 was a drought year and many species may not have germinated and grown.

2.8 WILDLIFE

Wildlife discussed are those whose habitat and resulting populations would be significantly changed by the proposed action or alternatives. These include mule deer, pronghorn antelope, waterfowl/water-associated birds, sage grouse, valley quail, nongame birds, small mammals, amphibians, reptiles, and fish. Data for this group are summarized in Table 2-9. Habitat distribution for mule deer, antelope, beaver, sage grouse, and fish is illustrated in Figures 2-7, 2-8, and 2-9. Data for five threatened or endangered species are summarized in Table 2-8.

Some wildlife inhabiting the ES area are not discussed because their populations are not expected to change significantly as a result of the proposed action or alternatives. These include elk, mountain lion, coyote, chukar partridge, mourning dove, pheasant, raptors, and invertebrates (insects, worms, snails, etc.).

Existing habitat condition and wildlife populations are largely the result of livestock grazing, range improvements and vegetative conversions. Big sagebrush has been eliminated or reduced on 130,000 acres (Table 2-4: existing communities of perennial grasses, crested wheatgrass, and annual grass). Water developments and seedings have altered wildlife habitat by increasing grazing intensity and changing livestock distribution. Most wildlife populations and habitat were not studied while these changes were occurring. There is little site specific information that documents which species were affected and by how much.

Wildlife data are largely limited to distribution and poplations of game species and inventory of fish habitat. Important inventory data for wildlife are lacking in the following areas:

Table 2-6

Range Condition and Trend Classes

Allotment Name and Number		Condition (acres) Good	Fair	Poor	Trend (acres) Up	Static	Down
5101	Devine Ridge	5,836	2,550	-	1,216	7,170	-
5102	Prather Creek	825	200	-	-	1,025	-
5103	Lime Kiln	-	3,314	-	1,150	2,164	-
5104	Soldier Creek	2,588	-	-	-	2,588	-
5105	Camp Harney	5,371	8,763	-	7,350	6,784	-
5106	Cow Creek	-	2,977	-	-	1,697	1,280
5108	Little Cow Creek	-	2,777	-	805	1,972	-
5201	Coleman Creek	2,504	-	-	-	2,504	-
5202	Hunter	2,778	-	-	2,778	-	-
5203	Catterson	-	640	-	-	640	-
5204	Solcum Field	-	1,917	-	-	1,917	-
5205	Venator	-	2,861	-	-	2,861	-
5207	Coyote Creek	-	1,098	-	1,098	-	-
5208	Emmerson	-	1,860	-	1,860	-	-
5209	Crane	1,935	-	-	1,935	-	-
5210	Windy Point 1/	-	-	-	-	-	-
5211	Beckly Home	-	1,494	-	1,494	-	-
5212	Mahan Ranch	-	4,577	-	-	4,577	-
5213	Beaver Creek	6,332	2,240	-	3,789	4,783	-
5214	Hamilton 1/	-	-	-	-	-	-
5215	Davies	-	3,442	-	1,274	2,168	-
5301	Princeton	18,376	-	-	18,376	-	-
5302	Big Bird	2,566	-	-	2,566	-	-
5303	Dry Lake	26,479	4,800	3,370	19,661	14,988	-
5304	Square Butte	5,001	-	-	5,001	-	-
5305	Crow's Nest	2,921	-	-	2,921	-	-
5306	Rocky Ford	4,457	-	-	4,457	-	-
5307	Smyth Creek	12,985	16,297	-	10,225	19,057	-
5308	East Kiger	-	8,720	-	4,650	4,070	-
5309	Happy Valley	-	3,844	-	1,466	2,378	-
5310	Riddle Mtn.	7,468	12,720	-	20,188	-	-
5311	Government Field	1,339	-	-	-	1,339	-
5312	Deep Creek 1/	-	-	-	-	-	-
5313	Burnt Flat	10,720	27,564	-	17,611	20,673	-
5314	Summit Springs	10,873	-	-	8,103	2,770	-
5315	S. Fork Malheur	18,019	19,521	-	37,540	-	-
5316	Virginia Valley	9,599	4,068	2,603	10,413	5,857	-
5321	Hamilton Ind. 1/	-	-	-	-	-	-
5324	West Kiger 1/	-	-	-	-	-	-
5501	E. Fork Cow Creek	-	2,510	-	-	2,510	-
5502	Rock Creek	3,720	280	-	440	3,560	-
5503	Pine Creek	12,057	6,829	1,280	17,061	1,825	1,280

Table 2-6 (Cont.)

Range Condition and Trend Classes

Allotment Name and Number		Condition (acres) Good	Fair	Poor	Trend (acres) Up	Static	Down
5505	Little Muddy	2,609	4,933	-	3,189	4,353	-
5506	Muddy Creek	825	3,303	-	825	3,303	-
5507	Wolf Creek	870	-	-	870	-	-
5508	Baker Knowles	845	-	-	845	-	-
5509	William Dripp Sp.	545	800	-	-	1,345	-
5510	Jones Dripp Sp.	-	762	-	-	762	-
5511	Moffet Table	10,170	5,042	-	10,676	4,536	-
5512	Clarks River	-	487	-	-	-	487
5513	Shelly & FFR	-	4,949	-	148	4,801	-
5514	Coal Mine Creek	981	-	3,596	-	981	3,596
5515	Mule Creek	2,713	2,711	-	-	5,099	325
5516	Birch Creek	1,340	-	-	-	1,340	-
5517	Otis Mountain	8,445	-	4,546	8,445	4,546	-
5518	Newell Field	-	990	-	-	-	990
5520	Little Upson 1/	-	-	-	-	-	-
5521	Rocky Basin	-	3,775	-	-	915	2,860
5522	Cottonwood	-	8,397	-	-	8,397	-
5523	Hart	-	1,277	-	1,277	-	-
5524	Tub Springs	698	2,471	-	698	2,471	-
5525	Mill Gulch	-	2,264	-	-	1,004	1,260
5526	Chalk Hills	6,231	2,710	-	4,123	4,818	-
5527	Drinkwater Summit	1,349	1,440	-	1,349	-	1,440
5528	Cooler	-	3,408	1,640	-	2,085	2,963
5529	House Butte	1,193	22,833	2,078	3,193	22,911	-
5530	River 2/	34,463	14,076	-	17,960	13,105	17,474
5531	Stinkingwater	13,417	10,044	-	5,238	18,223	-
5532	Mountain	11,974	22,237	-	15,053	19,158	-
5533	Buchanan	2,095	233	-	1,164	1,164	-
5534	Mahan Creek 1/	-	-	-	-	-	-
5535	Miller Canyon	-	6,572	-	-	6,572	-
5536	Alder Creek	23,864	5,515	-	11,847	9,920	7,612
5537	Buck Mountain	8,095	6,624	-	736	8,095	5,888
5538	Riverside	7,379	6,812	-	-	14,191	-
5541	Wilber FFR 1/	-	-	-	-	-	-
Total		314,848	292,530	19,113	293,064	285,972	47,455

Total public land acres surveyed - 626,491

1/ No transects taken

2/ Includes Allotments 5564 Wheeler Basin, 5565 Upton Mountain, and 5566 Texaco Basin

Note: Only public land acres are tabulated, and only on allotments with AMPs.

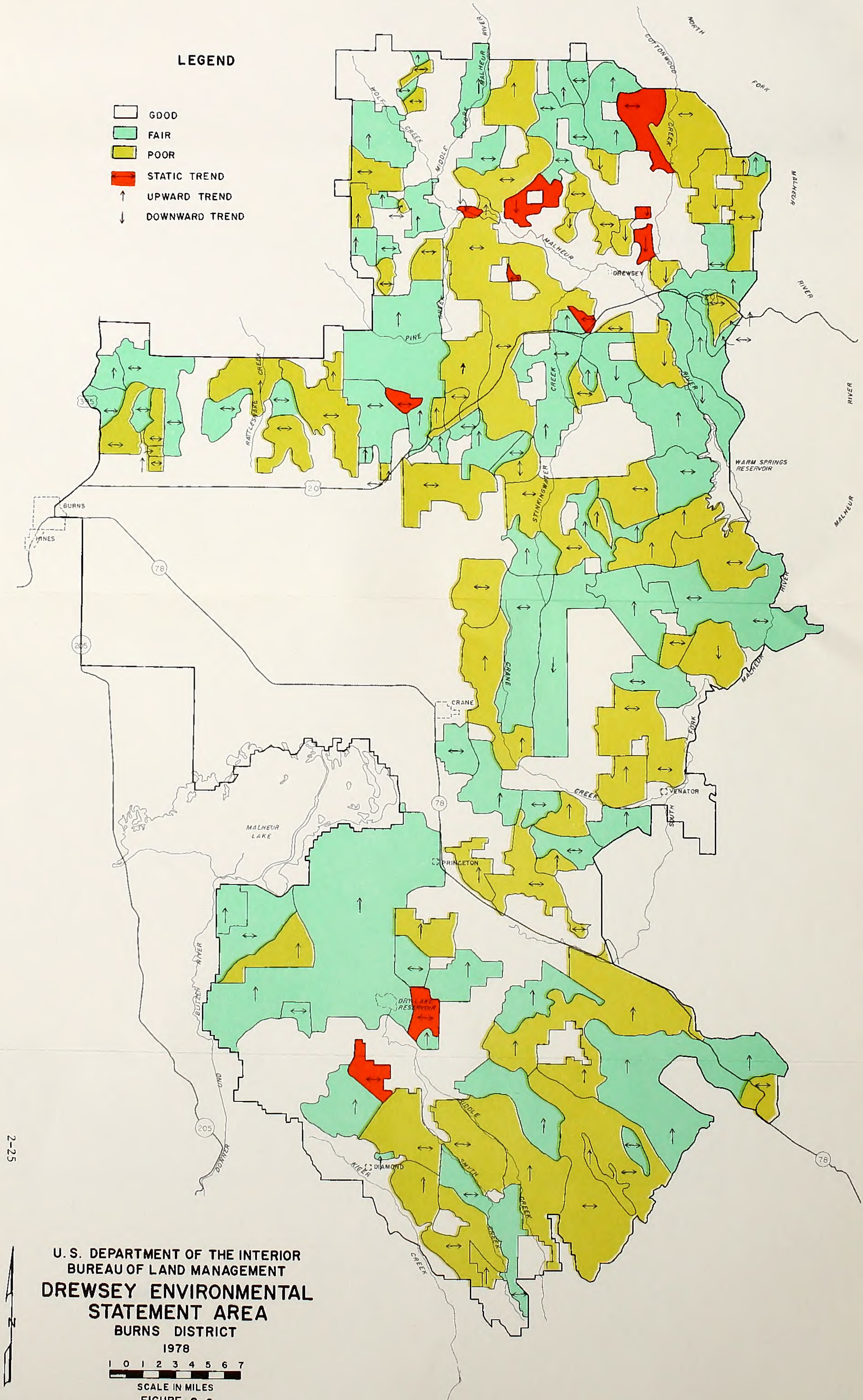


FIGURE 2-6

PRESENT RANGE CONDITION & TREND

Table 2-7

Potential Threatened and Endangered Plant Species
Likely to Occur in the Drewsey ES Area

Family	Scientific Name/Common Name	Status 1/	Habitat
Alismataceae	Alisma gramineum var. angustissimum	OR-111	In water, but rarely submersed
	Alisma gramineum var. gramineum	OR-111	Deep water
	Sagittaria latifolia (Broad-leaf arrowhead)	OR-111	Swamps, ponds, lakes
Apiaceae	Lomatium hendersonii (Henderson's lomatium)	T	Open slopes usually in heavy clay soils at lower elevations
	Rhysopterus plurijugus (Dwarf cork-seed)	T	Often associated with diatomite loose dry ground at lower elevations
Asteraceae	Artemisia tripartita (Threetip sagebrush)	OR-111	In moister or more favorable sites than big sagebrush
	Balsamorhiza hirsuta (Hairy balsamroot)	OR-111	On meadows and slopes in foothills
	Cirsium brevifolium (Palouse thistle)	T	Grasslands
	Cirsium peckii	OR-lb	Unknown
	Crepis modocensis var. modocensis	OR-lV	Unknown
	Dimeresia howellii	OR-lla	High desert
Brassicaceae	Draba douglasii (Douglas' draba)	T	Gravelly clay soil on open rocky ridges and knolls in foothills
	Draba sphaerioides var. cusickii	T	Unknown
	Lesquerella kingii ssp. diversifolia	T	Sandy and or gravelly soils on talus slopes, 4,000-8,500 feet
	Rorippa calycina var. columbiae	T	Damp sandy soil along stream and river banks
Campanulaceae	Nemacladus rigidus	OR-111	Unknown
Caryophyllaceae	Silene scaposa var. lobata (Scapose silene)	T	Gravelly meadows and hillsides at 7,500-9,000 feet with sagebrush
Cyperaceae	Carex interrupta (Green fruited sedge)	T	Low ground along streams
Fabaceae	Astragalus alvordensis (Alvord milk vetch)	T	Loose sand soils of volcanic origin, barren knolls, bluffs
	Astragalus nudisiliquus (Cobblestone milk-vetch)	OR-lb	Unknown
	A. tegetarioides (Deschutes milk-vetch)	OR-lb	Unknown
	A. tetrapterus	OR-111	Ponderosa pine forest in northern Harney County
	Lupinus biddlei (Biddle's lupine)	T	Unknown
	Lupinus cusickii ssp. abortivus	OR-lb	Dry plain
	Lupinus cusickii ssp. cusickii	OR-lb	Unknown
Liliaceae	Allium amplectens (Slim-leaf onion)	OR-llb	Unknown
	Allium anceps	OR-111	Unknown
	Allium bisceptrum (Palmer's onion)	OR-111	Unknown
	Allium campanulatum (Sierra onion)	OR-111	Meadows to open slopes
	Allium geyeri var. tenerum	OR-111	Dryish places, montane to alpine
	Allium lemmonii (Lemmon's onion)	OR-111	Unknown
	Allium parvum (Dwarf onion)	OR-111	Unknown
	Allium punctum	OR-lb	Dry, rocky soil
	Allium tolmiei var. tolmiei	OR-111	Unknown
	Calochortus nitidus (Broad-fruit mariposa)	T	Dried swales and prairies
Polygonaceae	Eriogonum chrysops (Golden buckwheat)	E	Decomposing granite
	Eriogonum cusickii (Cusick's buckwheat)	T	Rocky sagebrush desert
	Eriogonum novonudum	T	Dry stony clay slopes
	Eriogonum thymoides (Thyme-leaved eriogonum)	T	Sagebrush flats to low mountain ridges
	Polygonum heterosepalum (Dwarf desert knotweed)	OR-llb	Dry open flats to ponderosa pine forest
Portulacaceae	Claytonia megarhiza var. bellidifolia (Daisy-leaved spring beauty)	T	On gravelly soil and talus slopes, rock crevices near or above timberline
Potamogetonaceae	Potamogeton fibrillosus (Fibrous-stipular pondweed)	OR-llb	Unknown
Pteridaceae	Pellaea breweri (Brewer's cliff-brake)	OR-111	Shallow lakes and streams
Ranunculaceae	Ranunculus andersonii (Pink buttercup)	OR-111	Rocky places
Rosaceae	Ivesia baileyi	OR-lb	On well drained ponderosa pine or sagebrush areas
Scrophulariaceae	Castilleja applegatei var. applegatei	OR-lb	Rocky outcrops
	Castilleja glandulifera (Glandular paint-brush)	T	Open rocky or sandy pumice slopes
	Castilleja steenensis (Steens Mountain paint-brush)	T	Unknown
	Penstemon seorsus (Short-lobed penstemon)	OR-lb	Dry gravelly soil or mountain slopes, 7,500-8,500 feet
Violaceae	Viola adunca var. cascadensis (Cascade violet)	OR-llb	Dry plains and foothills Dry to moist meadows

1/ T - Candidate Threatened: 40FR127:27824-27924, 1975.
E - Proposed Endangered: 41FR117:24524-24572, 1976.
OR - Provisional list of Rare, Threatened, and Endangered Plants in Oregon
lb - Regional endemic
lla - Distribution wide but plants scattered and rarely collected
llb - Widely disjunct populations - few sites
111 - Of interest in Oregon only or status elsewhere unknown
lV - Populations of special interest

Source: Compiled from Hitchcock et al. 1973; USDI, FWS 1978a, 1978c

1. Condition and trend of vegetation used by deer and antelope (e.g., bitterbrush utilization, forb production data).

2. Ecological condition and trend of vegetation correlated with animal populations.

3. Location, condition and trend of critical habitat areas.

Critical habitat is a small part of an animal's range or habitat that contains special qualities or features which are essential for the animal's existence. Due to its scarcity, water and associated vegetation is critical habitat for most species. Meadows, riparian vegetation along perennial and intermittent streams, edges of reservoirs, seeps, springs, and overflows at livestock troughs cover only 0.1 percent of the ES area, but are very important to the many species using them. Some other examples of critical habitat are winter food and cover for deer, nesting trees for birds, and sage grouse strutting grounds.

2.8.1 Threatened and Endangered Species

Those wildlife species determined by the Secretary of the Interior to be threatened with extinction are on the "endangered species" list published in the Federal Register (FR). Some species in Oregon, while not endangered throughout their range, have remnant populations in danger of being eliminated in local areas. This has prompted the Oregon Department of Fish and Wildlife (ODFW) to develop a "threatened and endangered" species list. Data for a total of five State and Federal species are summarized in Table 2-8. Informal consultation under Section 7 of the Endangered Species Act of 1973 has been initiated with the U.S. Fish and Wildlife Service (FWS) by the BLM.

The bald eagle is distributed throughout Oregon, with major concentrations in forested areas around streams and lakes. About 30 wintering birds roost in the vicinity of Rattlesnake Creek, on or near public land. Most of their daily activity is on private lands in Harney Basin. No known nests occur in the ES area.

The peregrine falcon is rarely observed in the ES area. One recent sighting has been documented (USDI, FWS n.d.b).

Western snowy plovers in eastern Oregon are migrants generally found in dry, sandy areas around alkaline lakes. The birds have been observed around Stinking Lake and Harney Lake, both on Malheur National Wildlife Refuge. They nest near Harney Lake, outside of the ES area. The ES area does not contain habitat suitable for nesting.

The kit fox's range appears to be south of the Drewsey ES area; however, its habitat preference is such that it may potentially occur in the area.

Bobcats are relatively common in the ES area. Rocky rims, juniper, and rough topography are preferred habitat types.

Table 2-8

Threatened and Endangered Animals

Species	Status Federal	Status State	Habitat	Presence	Comments	Data Source
Bald eagle	T	T	Water snags, power poles, cliffs, coniferous trees	Confirmed	Known wintering population of 15-30 birds which roost in vicinity of Rattlesnake Creek	44 FR 12:3644, 1979 ODFW 1977 Mallette and Gould 1976 USDI, BLM 1976
Peregrine falcon	E	E	Open country with cliffs for perching, marshes	Confirmed	17 sightings in vicinity of Malheur National Wildlife Refuge, 1 in ES area.	44 FR 12:3644, 1979 ODFW 1977 Mallette and Gould 1976 Gabrielson & Jewett 1940 USDI, FWS n.d.b. USDI, BLM 1976
Western snowy plover		T	Dry sandy areas around alkaline lakes	Possible	Colony at Harney Lake 15 miles west of ES area. Unlikely to nest in ES area.	ODFW 1977 Gabrielson & Jewett 1940 USDI, BLM 1976
Kit fox		T	Arid high desert valleys	Possible	Present distribution is 30 miles south of ES area.	Ingles 1965 ODFW 1977
Bobcat	N		Rocky rims, juniper, ponderosa pine	Confirmed	Relatively common on public lands	42 FR 134:35996, 1977 Ingles 1965

E = Endangered - any species which is in danger of extinction through all or a significant portion of its range.

T = Threatened - any species which is likely to become "Endangered" within the foreseeable future through all or a significant portion of its range.

N = Notice of Status Review - species being examined by the U.S. FWS to determine if it meets the requirements for either threatened or endangered classification.

2.8.2 Mule Deer

Mule deer populations in the ES area began to increase about 1930, peaked in the early 1960's, and have been declining since. Declining deer populations have been observed in most of the mule deer habitat in the western states and no well documented explanations have been found.

Mule deer inhabit the entire ES area, but greatest concentrations are found on seasonal ranges shown in Figure 2-7. The ODFW estimated the winter population at 9,000 and the summer population at 3,700 (ODFW 1976). About half of the summering deer feed in private alfalfa fields and meadows at night and move to public lands during the day for cover. Summer ranges on public lands are considered noncritical because food and cover are usually adequate at this time of year. During the winter deer do not show a marked preference for feeding on private lands. Based on land status, wintering deer take about 60 percent of their forage from public lands.

Heaviest winter use occurs on 102,000 acres of critical habitat (Figure 2-7). Deer concentrate in critical habitat when snow forces them out of higher elevations. Food and cover provided by critical habitat is especially important because the deer's fat reserves are at a very low level during winter. Riparian vegetation (Figure 2-4), which is important for thermal cover and winter forage, is in poor condition for deer. Approximately 7,000 acres of winter range on public lands have burned and no longer provide critical habitat because sagebrush and bitterbrush have been eliminated.

Deer diets have been studied at two locations near the ES area. During a mild winter with little snow cover Trainer (1978) found that over 50 percent of the winter diet was grass, mostly Sandberg bluegrass. Vavra and Sneva (1978) studied herbivore diets in an area 30 miles west of the ES area. They found that deer used grass the greatest during spring (50 percent); during a normal winter, grass use was 20 percent. Fall and winter diets were dominated by juniper and sagebrush while summer and fall diets were primarily bitterbrush. Observations by district personnel indicate that the more palatable species such as squaw apple and bitterbrush are often heavily hedged by deer and cattle. Competition among herbivores is further discussed in Section 2.13.2.1.

Juniper, mountain mahogany, and rough topography provide good thermal and escape cover. In Allotments 5511 and 5516, the value of 5,000 acres used by deer for fawning has apparently been reduced because herbicide spraying has decreased the amount of big sagebrush cover.

Streams, springs, seeps, reservoirs and pipelines provide good water distribution. Water is not a limiting factor except in Allotment 5530 and, during drought years, in Allotment 5315.

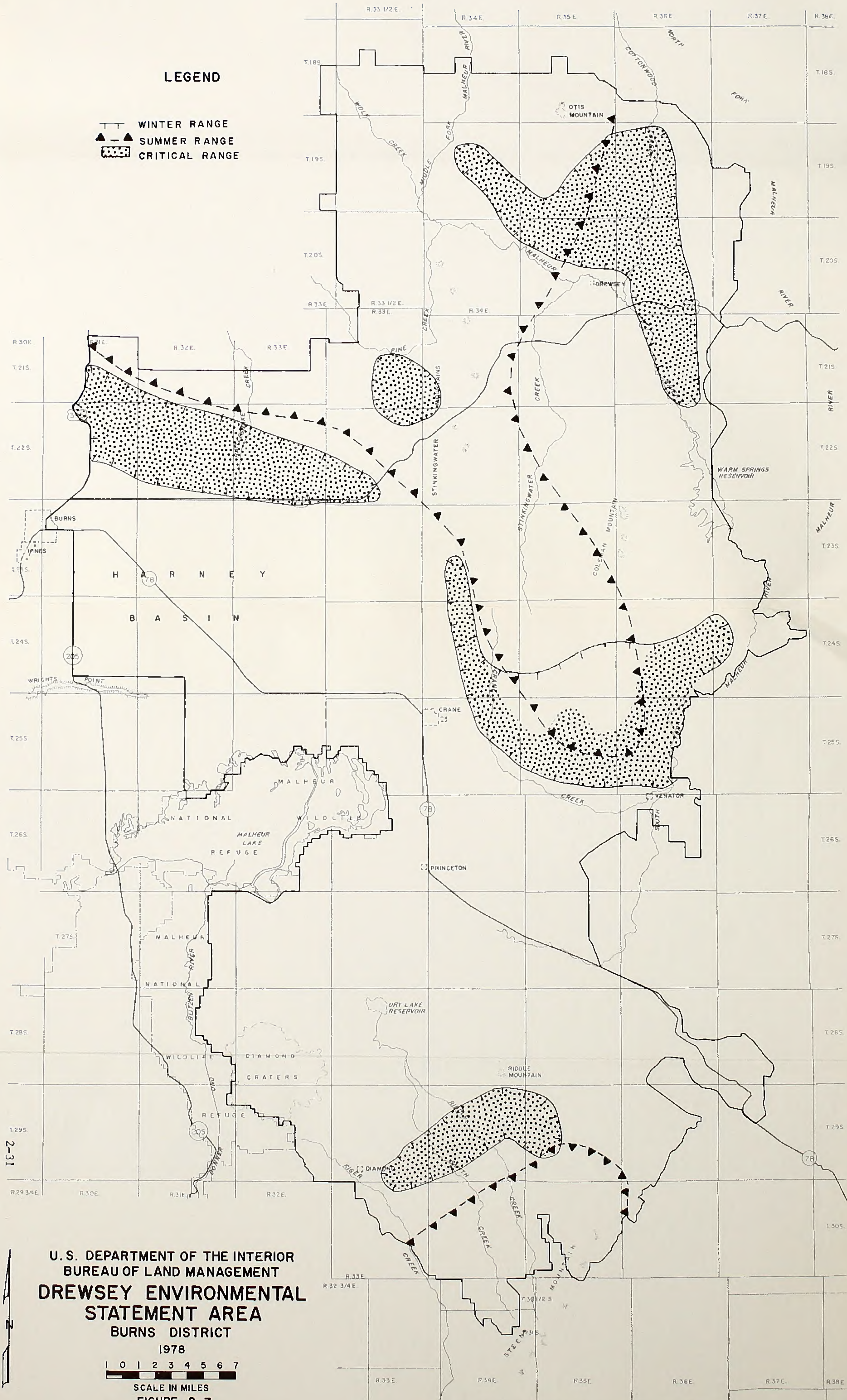
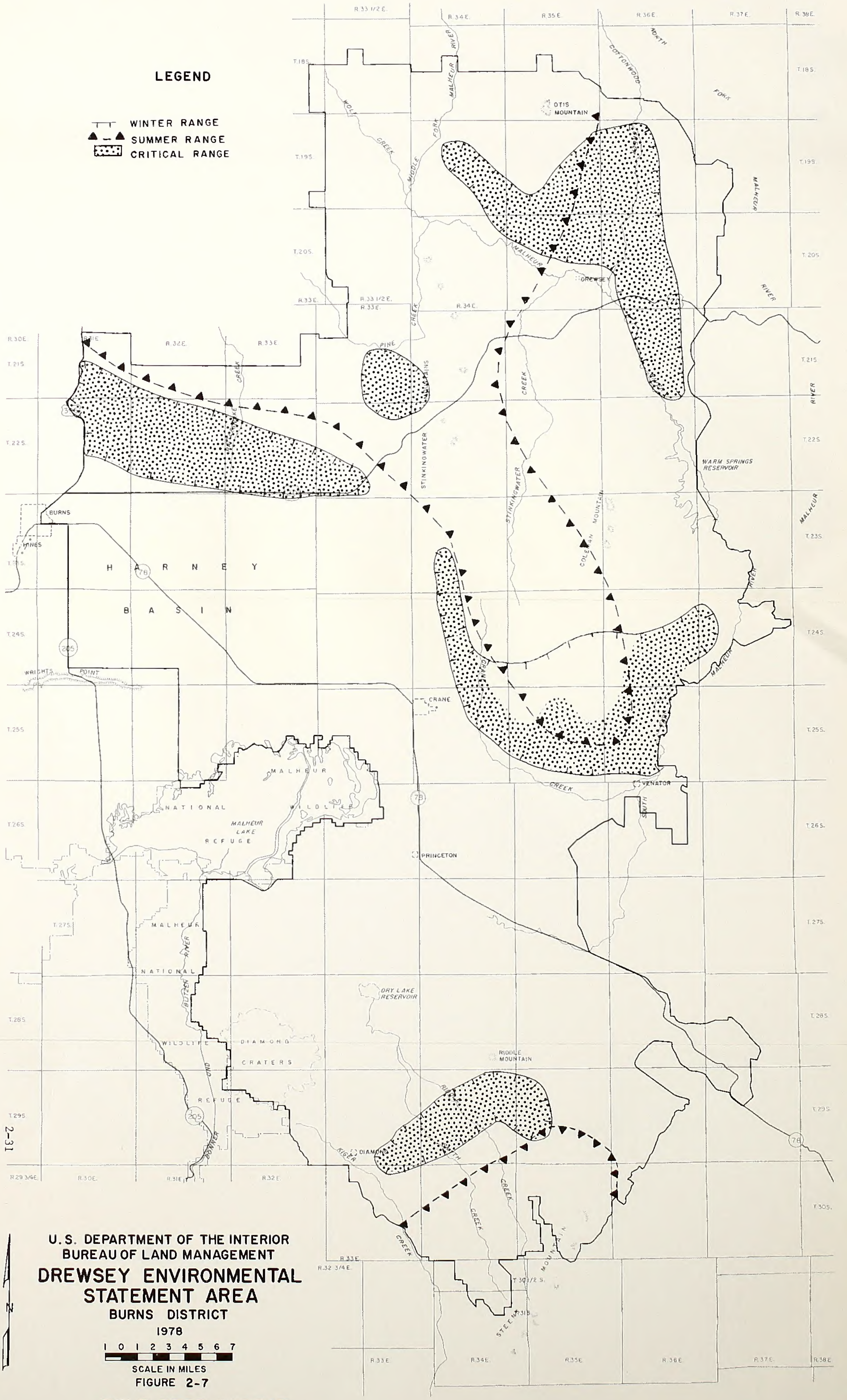


FIGURE 2-7

MULE DEER HABITAT



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

1978

SCALE IN MILES

FIGURE 2-7

MULE DEER HABITAT

2.8.3 Pronghorn Antelope

ODFW believes antelope were almost exterminated from the ES area by the mid-1940's, but had increased to peak numbers in 1953-54. They decreased until the mid-1960's and then increased to today's high levels. ODFW estimates the current summer population to be 570. Migrations increase the wintering population to an estimated 750 animals. Present numbers are within 5 percent of ODFW's antelope management objectives for the area (ODFW 1976).

Antelope are most common in seasonal use habitat illustrated on Figure 2-8. However, during the summer, antelope may be observed throughout the ES area. About 70 percent of the antelope habitat is on public land (Table 2-9). Most of the summer use occurs on the mosaic of juniper, low sagebrush and big sagebrush communities and crested wheatgrass (Figure 2-3). An estimated 240 to 260 antelope utilize seedings during the summer, mostly in the Dry Lake area.

One of the largest concentrations of antelope in Oregon is southwest of Warm Springs Reservoir. Up to 1,200 antelope have been counted between the reservoir and Coleman Mountain, but the average number of wintering antelope is 500 to 600. Most of this use is made in the crested wheatgrass seedings and the cheatgrass-Sandberg bluegrass area that has resulted from wildfire and sagebrush control.

Forage competition does not occur throughout most of the ES area because good condition range (Table 2-6) provides adequate forage for antelope. Forage competition with cattle does occur on 10,000 acres in fair range condition (Allotment 5531). Competition on other allotments has not been identified. The potential for competition is greatest during the spring and early summer when green forbs and grasses are in short supply. These desirable plants are scarce because of low rainfall and heavy use by livestock in riparian areas. Competition for palatable shrubs may also occur during the summer and fall when both cattle and antelope utilize shrubs such as bitterbrush (Vavra and Sneva 1978). Competition among herbivores is further discussed in Section 2.13.2.1.

Water is distributed over most of the antelope range and does not limit population levels.

Past brush control and wildfire has greatly improved antelope habitat. Dense stands of big sagebrush have been converted to grasses. Low growing vegetation is preferred by antelope because it permits quick movement and escape from danger. Juniper provides valuable shade in the summer.

Based on observations by district personnel, antelope habitat is in generally good condition except for Allotment 5531 which is in fair condition. Increasing antelope numbers may also be an indicator of good habitat condition. Vegetational data have not been analyzed to determine habitat condition.

2.8.4 Beaver

Remnants of washed out dams suggest that beaver were once much more abundant than at present. On public lands, distribution is now limited to a few animals along Smyth Creek and Stinkingwater Creek (Figure 2-9). The population appears to be decreasing because of little regeneration of woody plants. Heavy use by cattle in these areas eliminates most regrowth. Based on observations by BLM personnel, habitat is in poor/fair condition.

2.8.5 Small Mammals

Some representative species are black-tailed jackrabbit, mountain cottontail, pygmy rabbit, Townsend ground squirrel, deer mouse, sagebrush vole, least chipmunk, northern pocket gopher and kangaroo rat. Some species, such as the yellow-bellied marmot, are found in specific habitat types; while others, such as the deer mouse, are widespread over the ES area. Highest concentrations and diversity probably occur in riparian vegetation and meadows.

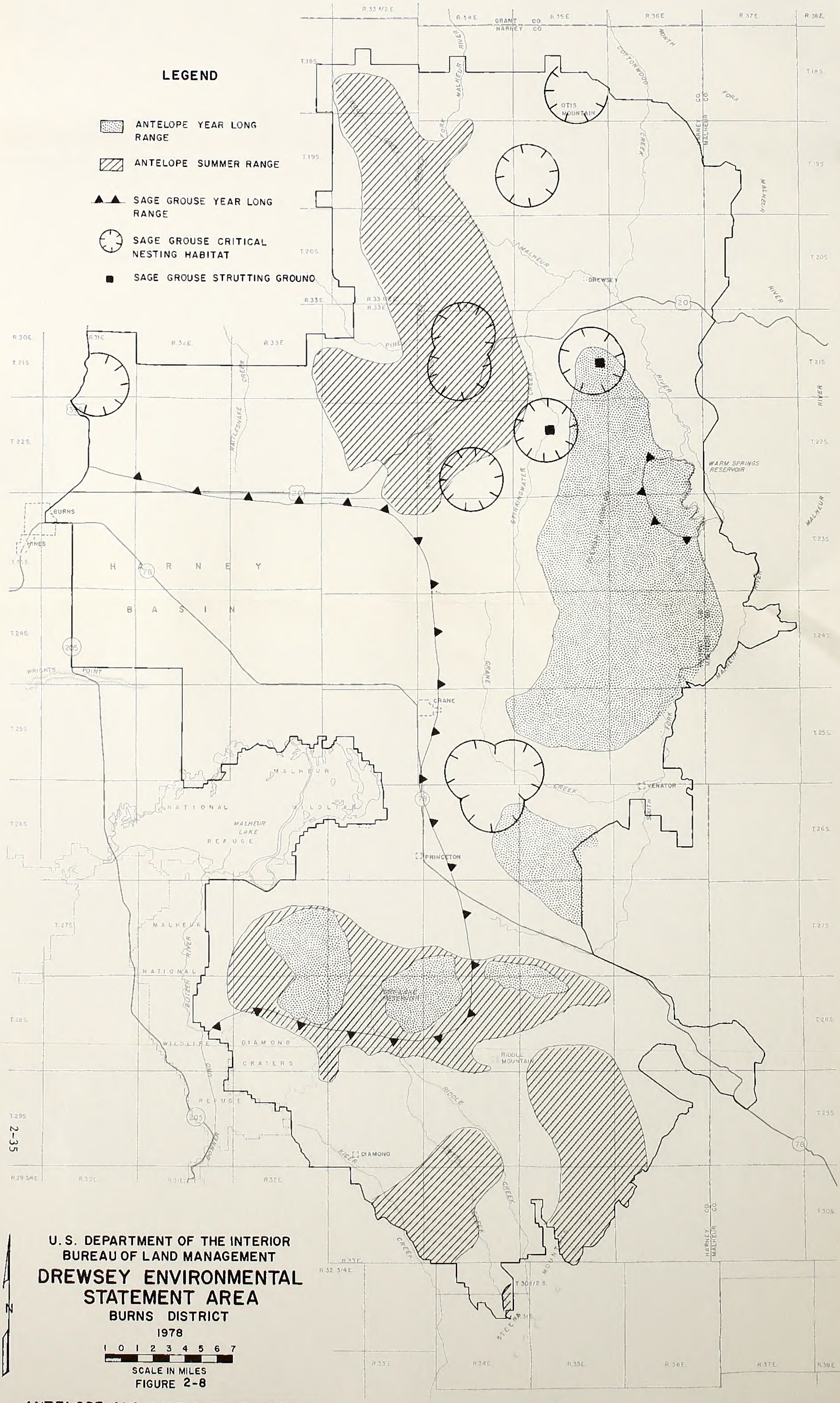
Observations by district personnel indicate that riparian and meadow vegetation are in generally poor condition because heavy livestock use leaves little vegetative cover for small mammals. Elimination and reduction of sagebrush has reduced some populations of small mammals because of the decreased vegetative diversity.

Ferguson (1975) found that spraying 2,4-D near the ES area to eliminate sagebrush also reduced black-tailed jackrabbits, least chipmunks and kangaroo rats.

2.8.6 Sage Grouse

Sage grouse are widely scattered over the ES area in the low sagebrush and big sagebrush communities. Populations are low, reflecting a downward trend over the past 10 years.

Two strutting grounds and nine nesting areas have been identified as critical habitat (Figure 2-8). Strutting grounds are critical because grouse mate each year in these natural clearings in the sagebrush. Most nesting occurs within 2 miles of a strutting ground. Residual herbaceous cover from the previous growing season and an overhead canopy of sagebrush is needed for successful nesting. Present condition and trend of nesting habitat is unknown. Upland meadows associated with springs and streams are critical habitat because they supply insects and succulent forbs to young birds (Savage 1969). Meadows are in generally poor condition for sage grouse because of heavy livestock use. The location of wintering areas and other strutting grounds within the ES area is unknown. Elimination of sagebrush on 25,000 acres of sage grouse habitat has reduced its value for sage grouse.



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

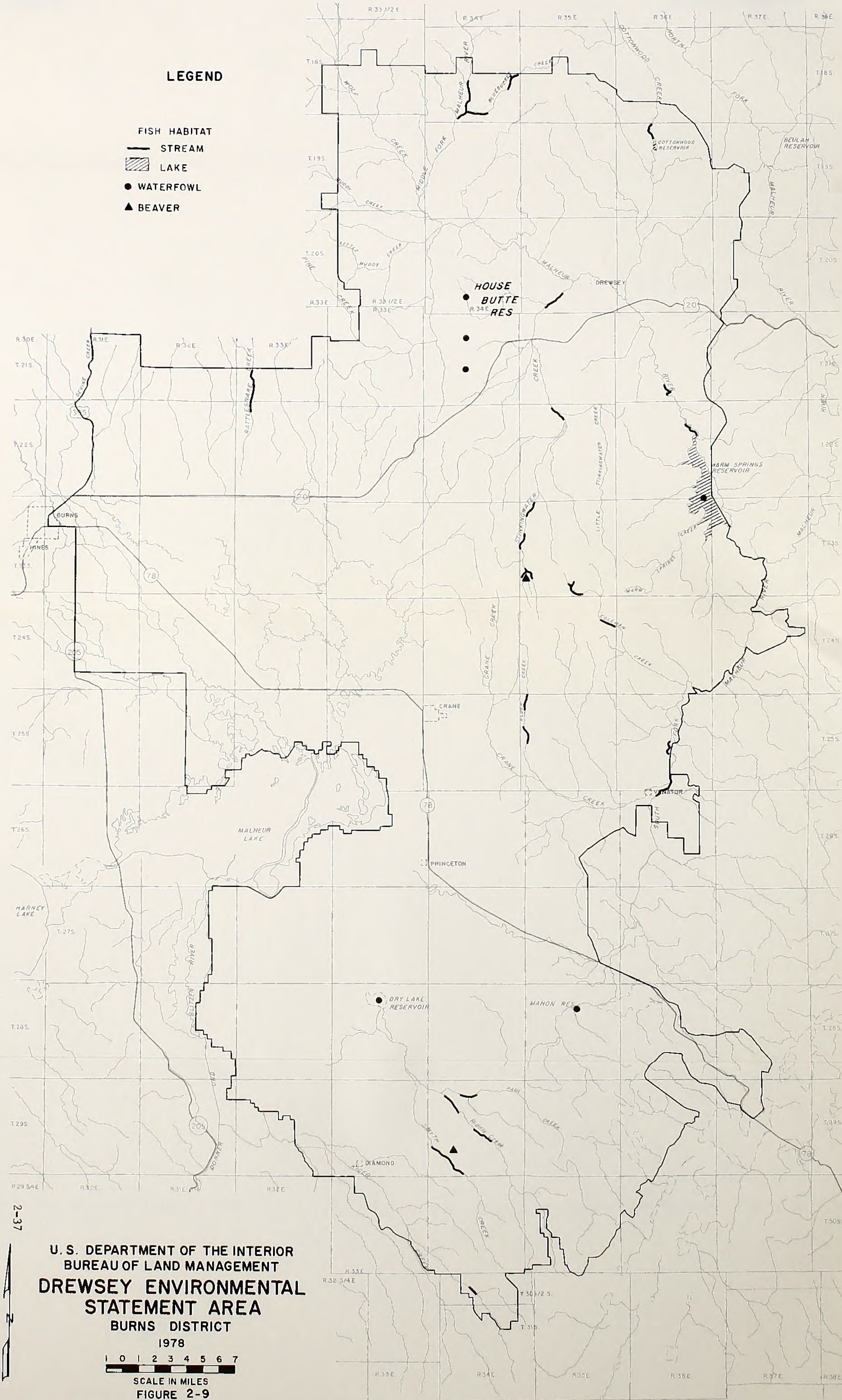
1978

1 0 1 2 3 4 5 6 7

SCALE IN MILES

FIGURE 2-8

ANTELOPE AND SAGE GROUSE HABITAT



2-37

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

1978

SCALE IN MILES

FIGURE 2-9

FISH, WATERFOWL & BEAVER HABITAT ON PUBLIC LANDS

2.8.7 Valley Quail

Valley quail are found primarily in riparian areas (Figure 2-4). Habitat is mostly in poor or fair condition because heavy cattle use reduces food and cover needed to sustain quail populations through the winter. Greatest conflict with present livestock use occurs on about 20 public stream miles along Paul, Riddle, Bluebucket, Coleman and Stinkingwater Creeks and the Middle and South Forks of the Malheur River.

2.8.8 Waterfowl and Water Associated Birds

Some representative species are the mallard, cinnamon teal, Canada goose, Wilson's phalarope, and killdeer. Concentration areas of greatest importance are illustrated in Figure 2-9. During spring migration about 1 million ducks, 200,000 geese and 30,000 whistling swans pass through the ES area. The most important waterfowl area on public lands is Dry Lake, where about 430,000 waterfowl use days occur annually (USDI, FWS 1978b). About 40 duck broods are produced each year at Dry Lake.

The South Fork and Middle Fork of the Malheur River receive relatively heavy use after local lakes and marshes freeze over. Warm Springs Reservoir and Cottonwood Reservoir are used primarily by migrating birds. Fluctuating water levels caused by irrigation limits reproduction at Warm Springs Reservoir. Reservoirs built to provide livestock water also provide habitat for waterfowl. About one brood of ducks is produced annually at each of four large livestock reservoirs. On all public lands, habitat condition for nesting is considered fair or poor because residual cover heights after livestock grazing are too low for good nesting cover the following spring.

2.8.9 Nongame Birds

The dominant species in the sagebrush and grass communities are horned larks, sage thrashers, Brewer's sparrows, and western meadowlarks. Robins, flickers, and Brewer's sparrows are common species in the juniper community. Gray jays, Clark's nutcrackers and various woodpeckers are found in the ponderosa pine community. Riparian habitat is heavily used by songbirds such as yellow warblers and red-shafted flickers. A list of species, relative abundance and general habitat types is available from the Burns District Office.

Riparian areas are in poor or fair condition because of sparse shrub and tree cover. Reduction of sagebrush has decreased habitat for birds requiring shrubs for nesting.

2.8.10 Reptiles and Amphibians

Representative species include the spotted frog, boreal toad, short-horned lizard and wandering garter snake. Habitat condition in riparian areas is

Table 2-9

Data on Wildlife Species in the ES Area

Species or Groups of Species	Habitat (public acres)	Population	Diet	Cover	Distribution by Allotment
Mule Deer	Critical Range 102,000 Noncritical Range 178,000	Winter 9,000 Summer 3,700	Spring: Browse 49%, Forbs 25%, Grass 26% Summer: Browse 49%, Forbs 47%, Grass 4% Fall: Browse 61%, Forbs 30%, Grass 9% Winter: Browse 74%, Forbs 15%, Grass 11% (Kufeld 1973)	Juniper Big sagebrush Mt. mahogany Ponderosa pine Aspen Rough topography	5101, 5102, 5103, 5104, 5105, 5106, 5108, 5201, 5202, 5203, 5204, 5205, 5308, 5309, 5315, 5501, 5502, 5503, 5505, 5507, 5508, 5510, 5511, 5512, 5513, 5517, 5518, 5520, 5521, 5522, 5523, 5524, 5525, 5526, 5527, 5528, 5529, 5531, 5532, 5533, 5535, 5536, 5537, 5538
Pronghorn Antelope	Yearlong 113,000 Summer 165,000	Winter 750 Summer 570	Spring: Browse 12%, Forbs 65%, Grass 23% Summer: Browse 41%, Forbs 56%, Grass 3% Fall: Browse 49%, Forbs 44%, Grass 7% Winter: Browse 73%, Forbs 23%, Grass 4% (Yoakum 1967, Mason 1952)	Juniper Sagebrush Crested wheatgrass Variable topography	5203, 5204, 5301, 5303, 5304, 5307, 5308, 5309, 5313, 5315, 5316, 5324, 5505, 5507, 5509, 5510, 5511, 5512, 5529, 5530, 5531, 5533, 5536, 5537, 5538, 5566
Beaver	2.5 stream miles	Low, declining	Willow, aspen, alder	Holes in bank	5307, 5532,
Small Mammals	Entire ES area	Abundant	Mostly herbaceous	Residual vegetation Sagebrush	All
Waterfowl/Water Associated Birds	2,250 terrestrial acres 5,000 aquatic acres	430,000 waterfowl use days 45 duck broods annually	Mat muhly Pondweed Crested wheatgrass Smartweed Sedges	Big sagebrush Basin Wildrye Ky. Bluegrass Foxtail Sedges	5213, 5303, 5315, 5511, 5530, 5538, 5566, 5529
Sage Grouse	Yearlong 533,000 Critical nesting 30,000	Low/declining	Spring: Sagebr. 80%, Grass 15%, Insects 5% Summer: Sagebr. 50%, Grass 35%, Insects 15% Fall: Sagebr. 70%, Grass 20%, Insects 10% Winter: Sagebr. 95%, Grass 0%, Insects 5%	Big sagebrush Low sagebrush Residual vegetation	All except 5301, 5316, 5302, 5305
Valley Quail	300 acres along 75 stream miles	Low	Seeds	Riparian vegetation	5105, 5205, 5206, 5307, 5309, 5310, 5313, 5315, 5503, 5511, 5522, 5529, 5530, 5531, 5532, 5536
Nongame Birds	Entire ES area	Abundant	Insects Seeds Berries	Residual vegetation Sagebrush Trees	All
Amphibians/Reptiles	Entire ES area	Abundant	Insects Mollusks Small vertebrates	Sagebrush Riparian vegetation Rocks	All
Fish	32 stream miles 4,505 reservoir acres	Unknown	Insects Small fish Crustaceans	Boulders, Logs Algae, Aspen Alder, High grass Big sagebrush Chokecherry, Willow	5105, 5206, 5307, 5309, 5310, 5323, 5511, 5522, 5529, 5530, 5531, 5532, 5536, 5538, 5566

Source: USDI, BLM, Burns District, Bureau Planning Documents

mostly poor or fair as indicated by stream survey data (Table 2-10). Past conversion of sagebrush to herbaceous vegetation was detrimental to reptiles and amphibians.

2.8.10 Fish

Species distribution and habitat condition are displayed in Table 2-10 and Figure 2-9. Data has not been collected which would give accurate estimates of present fish populations; however, the fisheries resource is believed to be much below potential because of stream habitat conditions.

The present poor and fair stream condition is largely the result of livestock grazing. Livestock remove riparian vegetation and trample streambanks resulting in siltation, loss of spawning habitat and cover, increased water temperature, and decreased insect production. Sparse vegetation cannot trap sediments which results in increased turbidity and bank cutting. These adverse conditions contribute to reduced fish populations (Armour 1977).

2.9 RECREATION

The Drewsey ES area has no developed recreation sites. However, opportunites for a number of recreational activities are available. Use of the area for most activities, other than sightseeing and hunting is minor. Most recreationists are local residents. Incidental use, primarily sightseeing, often results from the visitation of more spectacular areas such as the John Day area in Grant County, Steens Mountain, and Malheur National Wildlife Refuge which are in proximity to the ES area.

2.9.1 Recreation Related to Public Lands

Table 2-11 lists the estimated number of visits by selected recreation activities to the ES area during 1976 and shows percentages of total resource area use attributed to BLM-administered land. Recreational use projections for 1990 are also displayed.

2.9.1.1 Sightseeing

General sightseeing is often referred to as driving for pleasure and is associated with travel along established roadways. Based on 1974 traffic counts along major roads, an estimated 157,740 visitor days of general sightseeing were attributed to public lands within the ES area. Many people visit public lands with specific sightseeing goals. Others may sightsee while participating in other activities such as hiking or float boating. Figure 2-10 shows the location of areas which attract botanical, geologic, and wildlife sightseeing use.

Table 2-10

Fish Distribution, Habitat Condition, and Trend

Stream	Public Miles	Condition 1/	Trend	Species Present 2/	Allotment	Comments
Alder Creek	2.1	Poor/Fair	Static	D,RB	5536	Heavily grazed; little cover; intermittent.
Bluebucket Creek	2.9	Poor/Fair	Down	RB	5511	Severe habitat damage from grazing, logging, channelization and road construction.
Coleman Creek	5.4	Poor/Fair	Static	D,RB	5536	Parts of stream heavily grazed. Some willow invasion is improving conditions on .5 mile section.
Cottonwood Creek	.6	Poor	Down	CO,RS,RB	5522	May no longer be viable trout habitat.
Deep Creek	.3	Fair	Down	RB	5312	Fair willow cover.
Lee Creek	.3	Poor	Static	RB	5511	Damaged by grazing and logging activities.
Middle Fork Malheur River	3.1	Poor/Fair	Down	RB,SB,CC, D,RS,YP, BR,BS,CL, CP,SQ	5511 5530	Severe bank erosion, heavily grazed along parts of lower .8 miles.
South Fork Malheur River	2.6	Poor	Static	BS,CO,D, RB,RS	5206 5205	Little cover; marginal trout habitat due to low summer flows and high water temperatures.
Paul Creek	.9	Poor	Down	RB	5310	Severe bank erosion in places.
Rattlesnake Creek	2.7	Poor/Fair	Down	D,RB	5105	Siltation from road construction.
Riddle Creek	2.4	Fair/Good	Static	CO,D,RB, RS	5310 5309	Bank erosion healing in places.
Smyth Creek	2.9	Poor/Fair	Down	D,RB,RS	5307	Heavily grazed; beaver are cutting down mature trees.
Stinkingwater Creek	5.1 .3	Poor/Fair Excellent	Down Static	BS,CS,D, RB,RS,SQ	5532	Large boulders protect excellent portion from cattle use.
Warm Springs Creek	.3	Poor	Down	BS,CL,RB, RS	5530	Heavily grazed, intermittent.
Reservoir	**Acres**					
Cottonwood	85	Poor/Fair	Static	BS,CO,RB, RS	5522	Severe water level fluctuations due to irrigation.
Warm Springs	4,420	Poor/Fair	Static	BG,BR,BS, CC,CL,CS, LB,RB,RS, SB,SQ,YP	5530 5538	Severe water level flucutations due to irrigation.

1/ Condition class definitions and stream survey methodology in Appendix B7.

2/ BG - Bluegill sunfish; BR - Brown bullhead; BS - Bridgelip; CC - Channel catfish; CL - Chiselmouth; CO - Cottid; CP - Carp; CS - Coarsescale sucker; D - Dace; LB - Largemouth bass; RB - Rainbow and Redband Trout; RS - Redside Shiner; SB - Smallmouth bass; SQ - Squawfish; YP - Yellow perch

Source: USDI, BLM, Burns District. 1974-75 stream surveys.

Table 2-11

Estimated Current and Projected Recreational Visitation to the Drewsey ES Area

Recreational Activity	Visitor Days Per Year (1976) Total	BLM	Percent Attributed to Public Lands	Demand Projection-1990 1/ Visitor Days/Year Total	BLM
1. Fishing	2,880	370	13	3,910	510
2. Hunting					
Big Game	5,050	2,980	59	6,850	4,040
Small Game	1,500	990	66	2,030	1,340
Upland Game	960	500	52	1,300	680
Waterfowl	825	290	35	1,120	390
Total 2/	11,220	5,130		15,210	6,960

1/ The Oregon Department of Transportation (1972) projected that recreational visits to southeast Oregon will increase by an average annual amount of 2.2 percent.

2/ Total does not include general sightseeing or miscellaneous recreation use. Traffic counts in 1974 indicate that about 157,740 visitor days of general sightseeing were attributed to public lands within the ES area.

Source: USDI, BLM, Burns District. Bureau planning documents.

General scenery is discussed in Section 2.11 dealing with visual resources. Archeological and historical sites with sightseeing value are discussed in Section 2.10, Cultural Resources.

Geological attractions include Diamond Craters, Wrights Point, Kiger Gorge, and Malheur Cave. The latter three are adjacent to, but not within, the ES area. Diamond Craters has been proposed for outstanding natural area status. One of the proposed routes for the High Desert Trail would traverse Diamond Craters along established roads and trails.

Botanical values within the ES area are primarily of scientific interest. Diamond Craters is noted for unique plant species, but none are threatened or endangered. Hatt Butte is notable as an ungrazed area.

Ten areas have been identified as having a variety of zoological sightseeing values. Areas with zoological values include Round Barn, Diamond Craters, sage grouse strutting areas, waterfowl observation areas, and a wild horse viewing area at Coleman Mountain.

2.9.1.2 Hunting

In addition to sightseeing, hunting is a primary recreational use. Numerous areas for big game, small game, upland game, and waterfowl hunting exist within the Drewsey ES area.

2.9.1.3 Miscellaneous Recreation Opportunities

The area offers good fishing opportunities for both warm water and cold water species. The South and Middle Forks of the Malheur River and the Warm Springs Reservoir provide major fisheries, although little of the use is attributed to BLM-administered land. Small creeks also provide fishing opportunities. Water fluctuation, sedimentation from bank erosion, and lack of access limit angling potential.

Little water-based recreation use occurs in the ES area, although Warm Springs Reservoir has potential for powerboating, waterskiing, and sailing. The Middle Fork of the Malheur River has some floatboating potential, but little or no use occurs.

Current winter sports are those associated with snowmobiling and cross-country skiing. Figure 2-11 shows popular snowmobiling areas. These snowmobiling areas become less attractive as snow accumulates at higher elevations.

Rock and mineral collectors hunt for agates, fossils, and petrified wood. Collecting areas are quite depleted and contain only scattered and sparse finds. Figure 2-11 shows the collection areas, which are north and south of U.S. 20.

Off-road vehicle use is generally limited to roads because of large boulders, extreme topography, and heavy vegetation. The area west of Warm Springs Reservoir has potential for ORV use.

A number of areas have potential for further management of their recreation values. Table 3-11 lists areas with notable recreation management opportunities which could be impacted by the proposed action.

2.10 CULTURAL RESOURCES

The term "cultural resources" refers to remains of human activity. However, since fossils of historic, scientific, and unusual interest are protected by the Antiquities Act of 1906, this category is also included in this

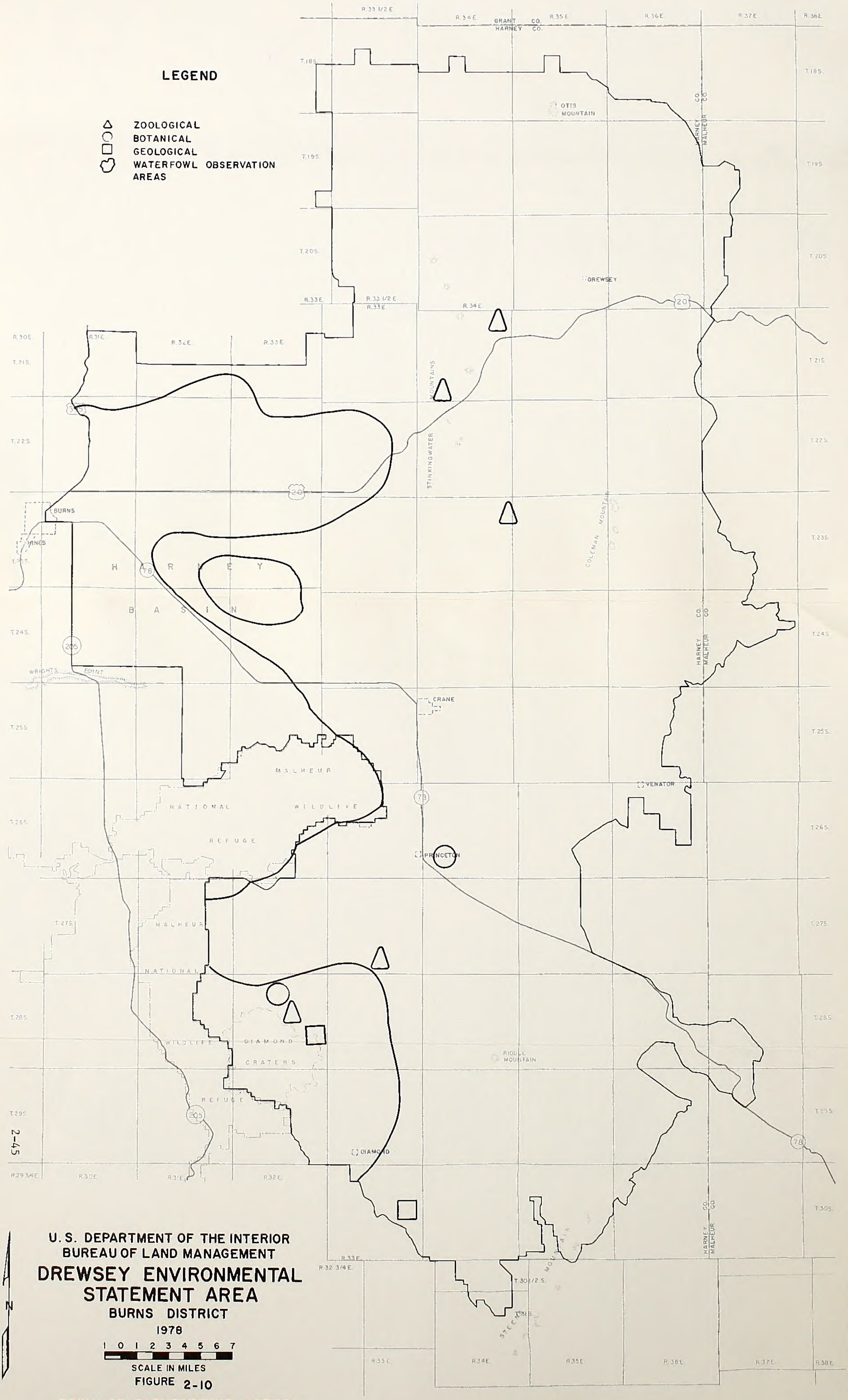
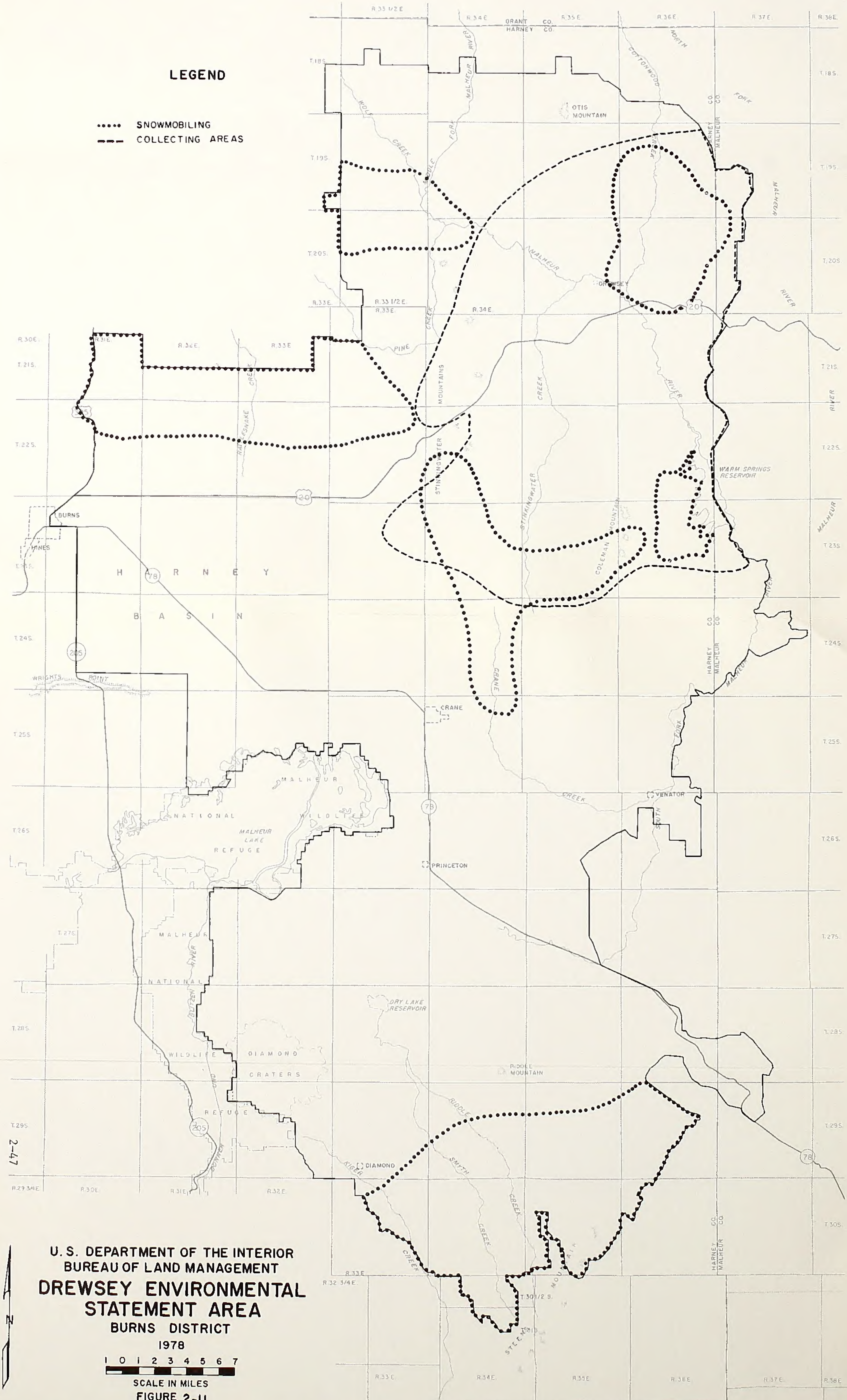


FIGURE 2-10

POPULAR SIGHTSEEING AREAS



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SCALE IN MILES

FIGURE 2-11

POPULAR SNOWMOBILING & COLLECTING AREAS

section. The BLM has been authorized to identify, protect, and enhance cultural resources on public lands. The following were consulted to identify these resources within the Drewsey ES area:

1. The State Historic Preservation Office was asked to identify sites that are on or eligible for nomination to the National Register.

2. Pertinent literature, both published and unpublished, was consulted. Sources used are listed under References Cited.

3. Knowledgeable individuals were consulted. They included professional and amateur archeologists and elderly residents.

4. The Burns District Cultural Resources Specialist provided information acquired through project clearance and general reconnaissance of the area.

5. The most recent listing of the National Register of Historic Places was consulted.

6. A field survey was conducted in 1975 for a proposed 11-mile highway relocation project near Buchanan. This survey was conducted by David Cole, curator at the Museum of Natural History, University of Oregon.

2.10.1 Prehistoric Sites

The Harney Basin formerly contained a large Pleistocene lake and should have provided a relatively fertile environment for human habitation. For this reason the potential archeological site density of the Drewsey ES area is suspected to be fairly high. According to the Oregon State Historic Preservation Office, a density of more than 10 sites per square mile can be expected in some portions of the area.

The prehistoric site inventory for the Drewsey ES area is very deficient. Only one survey has been conducted within the area itself. In 1975, David Cole surveyed a proposed 11-mile highway relocation project near Buchanan and reported 13 archeological sites. There is no indication that the 13 sites represent anything other than the Desert Culture Tradition. In 1974, Fagan's study of Altithermal spring sites listed one site within the ES area which is also representative of Desert Culture. Another site is a pictograph site, not likely to be more than a few thousand years old. Appendix F lists prehistoric sites and their attributes. With one exception, these sites are not in a good state of preservation, are small sites, and are relatively common in the region.

2.10.2 Historic Sites

Table 2-12 lists historic sites within the ES area. Figure 2-12 shows their locations. Although little remains today of historic travel routes,

Table 2-12

Historic Sites

Figure 2-12 Location	Site Name	Allotment	Status	Quality Evaluation
1.	Winnemucca Wagon Road	2/	J	7/C
2.	Drewsey - Harney Roads	2/	J	6/C
3.	WVCM Military Road	2/	J	13/B
4.	Meeks Wagon Train	2/	J	13/B
5.	Drewsey Townsite	5557	P	12/B
6.	Fort Harney	3/	P	10/C
7.	Malheur National Wildlife Refuge	3/	F	13/B
8.	Malheur Indian Reservation	2/	J	8/C
9.	Sod House Ranch (nominated to National Register)	3/	F	17/A
10.	Sod House Site (nominated to National Register)	3/	F	7/C
11.	Pete French Round Barn (National Register)	3/	S	18/A
12.	Smyth Ranch House	3/	P	12/B
13.	John Jenkins Homestead	5313	P	7/C
14.	Diamond Townsite	5319	P	12/B
15.	Lawen Townsite	3/	P	7/C
16.	Crane Townsite	3/	P	10/C
17.	Harney Townsite	3/	P	13/B
18.	Old Princetown Townsites	5325	P	7/C
19.	Voltage Townsite	5303	P	6/C
20.	Riverside Townsite	3/	P	7/C
21.	Coon Town	3/	P	6/C
22.	Rock Ford	3/	F	7/C
23.	Busse Dam	3/	F	7/C
24.	Venator Townsite	5205	P	6/C
25.	Warm Springs Dam	3/	F	13/B
26.	County Road to Barren Valley	2/	J	8/C
27.	Cave House	5542	P	12/B
28.	A.W. Hauser Cabin	3/	P	9/C
29.	Van Townsite	3/	P	6/C
30.	Albriton Townsite	3/	P	6/C
31.	Harriman Townsite	3/	P	6/C
32.	Waverly Townsite	3/	P	6/C
33.	Canyon City - Fort Harney Road	2/	J	6/C

1/ Quality ratings are based upon historical significance, condition of the site as compared to similar features, documentation available, uniqueness, and ability to arouse curiosity. BLM Manual 6111, Quality Evaluation of Recreation Use Opportunities, describes methodology for completing quality evaluations.

2/ Site involves several allotments which can be determined by comparing Figure 2-12 with Figure 1-1.

3/ Site is located outside of allotment boundaries.

Land Status:
BLM - - - - - - - - - - - - - B
Other Federal - - - - - - - F
State - - - - - - - - - - - - - S
Joint - - - - - - - - - - - - - J
includes B, F, S and P or combination
Private - - - - - - - - - - - P

Quality Evaluation:
High - - 16 to 18 A
Medium - 12 to 15 B
Low - - Less than 12 C

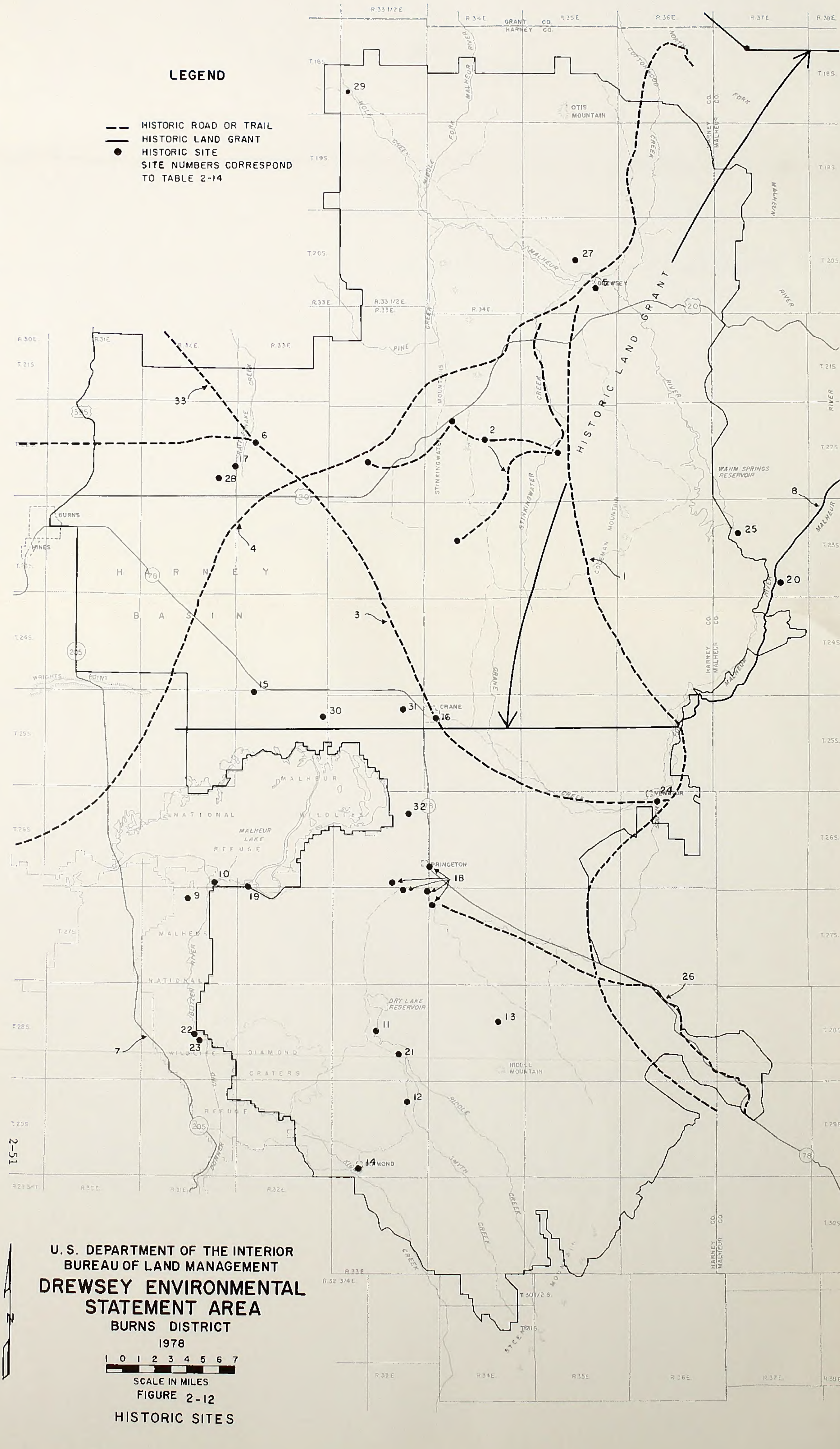

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FIGURE 2-12

HISTORIC SITES

most are well documented and their general locations are shown. The Pete French Round Barn is currently on the National Register of Historic Places. The Sod House Ranch and Sod House Site have been nominated for inclusion on the National Register.

2.10.3 Paleontologic Sites

Fossils are an important and nonrenewable resource. Vertebrate and certain invertebrate fossils are protected within the scope of the Antiquities Act as identified in Section 1.2.2.2. While the ES area has not been thoroughly surveyed, Pliocene fish and leaf fossils are known to occur in the vicinity of U.S. Highway 20 (Figure 1-1). None of the known fossils within this area are of remarkable interest.

2.11 VISUAL RESOURCES

The BLM has a system for identifying scenery quality and setting minimum standards for management of visual resources (Manual 6310). The visual resource management (VRM) inventory and evaluation comprise an integral part of multidisciplinary planning and are included in the procedure for planning resource use and development. Three key factors are considered in evaluating the amount of modification the natural landscape can sustain: the inherent quality of the scenery being viewed, the visual sensitivity of the type of visual use, and the visual distance (whether an area can be seen as foreground-middleground, background, or seldom seen from a travel route or sensitivity area).

After scenic quality, sensitivity levels, and distance zones are determined, they are compared to determine the VRM classes (see Glossary). Figure 2-13 shows VRM classes for the Drewsey ES area.

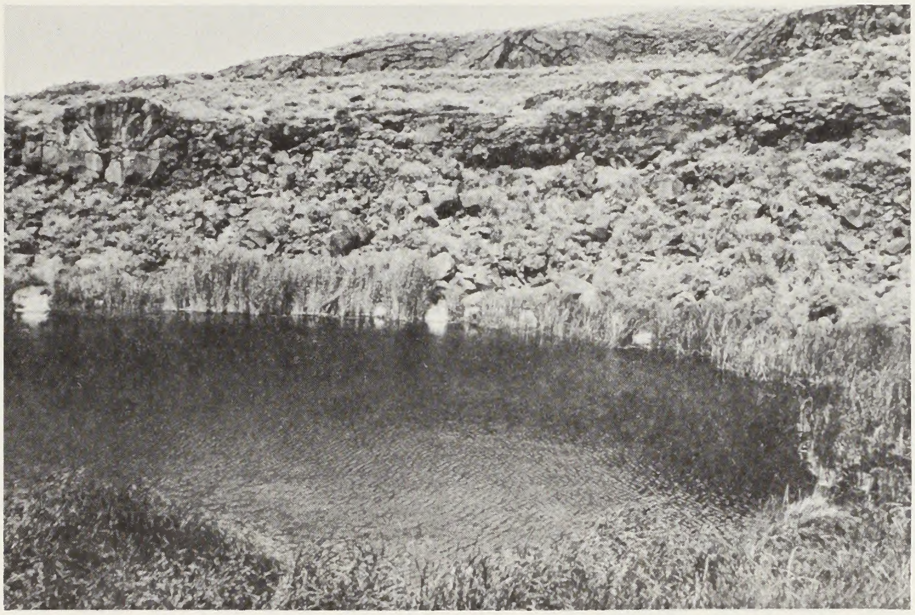
Each VRM class has specific management objectives and allows for differing degrees of modification in the basic elements (form, line, color, texture) of the landscape. The following photographs show examples of VRM Class I, II, and IV in the Drewsey ES area. The four classes are defined as follows:

Class I: This class provides primarily for natural ecological changes only. It is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.

Class II: Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.

Class III: Changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

Bluebucket Creek
is managed
as VRM Class I



Diamond Craters is
managed under VRM
Class II objectives

This rangeland in the southern
part of the ES area is typical
of VRM Class IV

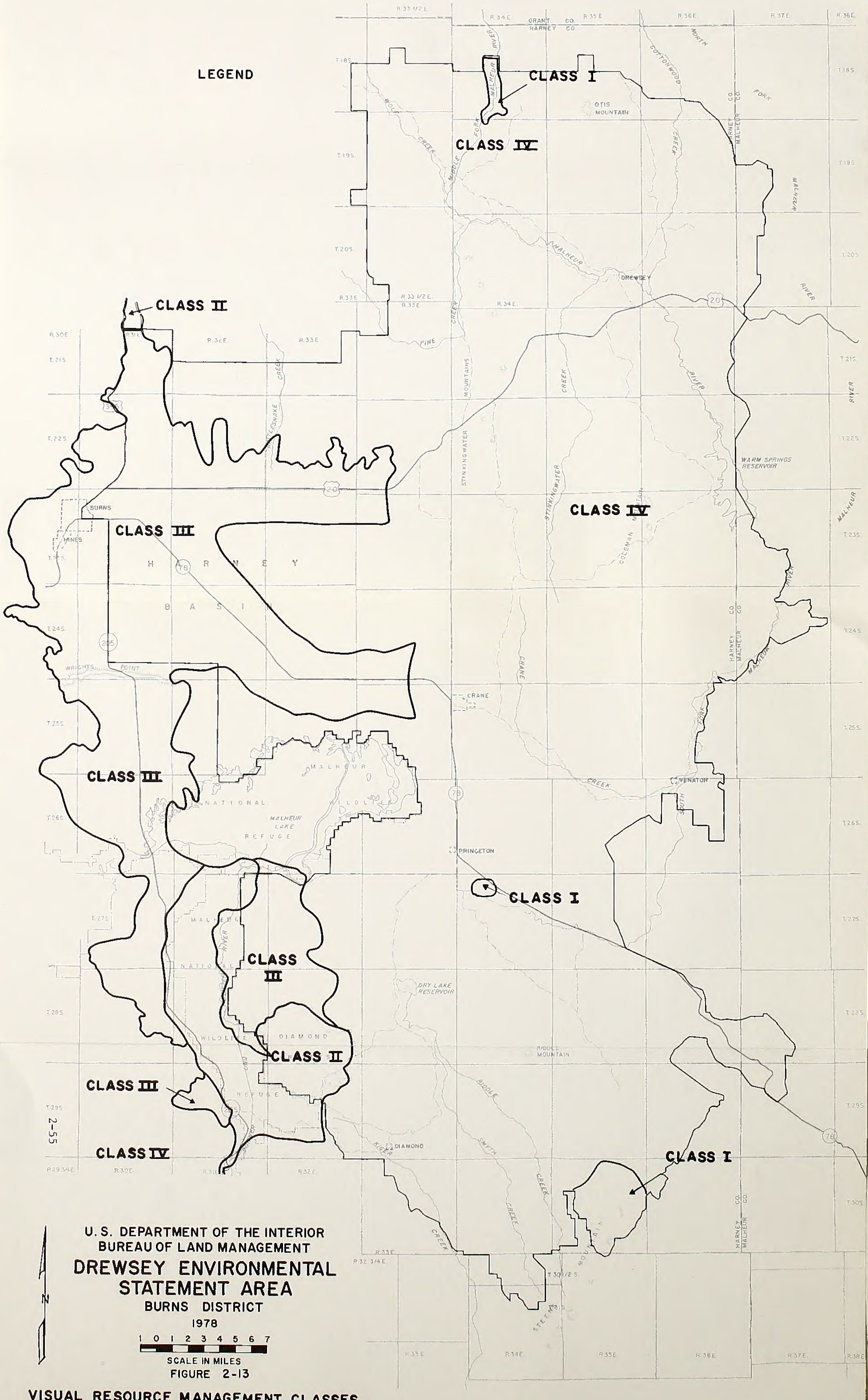


FIGURE 2-13

VISUAL RESOURCE MANAGEMENT CLASSES

Class IV: Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

2.12 WILDERNESS VALUES

Under the terms of the Federal Land Policy and Management Act of 1976 (FLPMA), roadless areas of 5,000 acres or more that have wilderness characteristics are to be reviewed within 15 years. Prior to the enactment of FLPMA, BLM had a process for designation of areas with wilderness characteristics as primitive areas. This process has been superseded by the wilderness review procedures under FLPMA.

There are no designated primitive areas within the ES area. Six areas were examined for potential designation under pre-FLPMA procedures. Of these, the Middle Fork Malheur/Blue Bucket and Squaw Lake areas meet minimum primitive area standards when combined with contiguous U.S. Forest Service and BLM-administered lands. These two areas are currently managed as VRM Class I areas (see Section 2.11). The remaining four areas do not qualify.

An area-wide wilderness inventory has not been conducted to date. However, an inventory was conducted in late 1977 to identify roadless areas along a proposed 500kv powerline which would traverse the ES area (USDI, BLM 1978a). Ten roadless areas were identified within the statement area (Table 2-13). Procedures used to inventory wilderness characteristics in the roadless areas were based on Sections 2(c) and 4(b) of the Wilderness Act of 1964. Within the ES area, 2 out of 10 areas identified may have sufficient wilderness characteristics to warrant their being further considered as possible wilderness study areas.

2.13 LAND USE

2.13.1 Agriculture

Agriculture in the Drewsey ES area includes both crop and livestock production. The bulk of the area's crop production occurs in Harney Basin or along alluvial valleys throughout the ES area.

Agriculture in the ES area consists of both irrigated and dry land farming on private lands. Irrigated crops are primarily native grass hay, alfalfa hay, and small grains. Most irrigation water comes from streams and during dry years ceases by mid-July. However, wells drilled in the Harney Basin have, within the past few years, brought many more acres under production with the added advantage of season-long irrigation. The primary limitation to crop production is the short, frost-free growing season.

Table 2-13

Roadless Areas in the Drewsey ES Area
Along the Proposed Powerline from Malin to Midpoint1/

		Acres of BLM-Administered Land	
		Roadless Area	Recommended by BLM for Future Consideration as Wilderness Study Area
OR-02-01-01	Coleman Creek	72,300	65,900
OR-02-01-02	Warm Springs	52,400	32,200
OR-02-01-03	Stinking Water	48,500	
OR-02-01-04	Crow Camp	8,500	
OR-02-01-05	Buchanan	10,000	
OR-02-01-06	Rock Creek	9,900	
OR-02-01-07	Mortimer Canyon	6,300	
OR-02-01-08	Fort Harney	7,700	
OR-02-01-09	Cherry Spring	9,800	
OR-02-01-10	Devine Ridge	7,000	

1/ Locations are shown on inventory map available at BLM, Oregon State Office. Allotments within these roadless areas can be determined by comparing the inventory map with Figure 1-1.

Source: USDI, BLM. Inventory of Roadless Areas and Islands, Alternate Route I for Pacific Power and Light Company's Proposed 500 KV Powerline--Midpoint, Idaho to Malin, Oregon. BLM, Oregon State Office (Portland)/Idaho State Office (Boise) 1978.

2.13.1.1 Prime and Unique Farmlands

There are no unique farmlands in the ES area. Nor are there prime farmlands on public lands, since an adequate and dependable moisture supply is necessary for lands to meet the USDA Soil Conservation Service's definition of "prime". With irrigation, the following soil units (as described in Appendix D) may qualify as prime: 1, 6, 10, 13, 14, 15, 26, 31, 43, 47, 51, 55, 60. However, even with irrigation, these soils are marginal as prime farmlands because of the climate in the area.

2.13.2 Livestock Grazing

Livestock grazing has occurred in the ES area since the late 1880's when the Harney Basin was settled. Use by sheep, cattle and horses was quite severe where water was available. The range deteriorated rapidly under heavy grazing pressure and erosion increased.

Following the enactment of the Taylor Grazing Act in 1934, some grazing management was implemented. Numbers of livestock were reduced and grazing seasons were established. Specific allocations of public range were made to local livestock operators who owned or controlled base property, i.e., those lands in a ranching operation which are owned or under long-term control of the operator and have the capability to sustain the number of livestock for a specific time period when they are not grazing on public lands.

While the Taylor Grazing Act did bring about some stability to ranching operations with Federal grazing permits, it did little to solve the overgrazing problem on the Federal range. Abandoned and wild horses, trespass livestock and authorized livestock grazing continued to cause an overgrazing problem.

In 1958, BLM started alloting the available forage production among the qualified users. Allotments, some individual and some common, were established. Since that time grazing trespass has been significantly reduced, considerable range improvements have been made and grazing systems have been initiated on 64 allotments to bring about an improved range condition (see Table 1-2 for allotments, Table 1-3 for grazing systems and Table 2-6 for range condition by allotments).

At present there are 123 allotments with 82 permittees in the ES area. With the exception of one permittee who runs 40 sheep, all permittees are licensed to run cattle. Most of these are cow-calf operations which vary from less than 100 cattle to more than 1,000; the average for the ES area is about 400 head. Although most calves are marketed in the fall at weaning time, some are carried over as yearlings. Typically the permittees graze livestock on public lands from 3-5 months during spring, summer, or fall (see Table 1-2) and on private lands during the balance of the year. Forty permittees also have grazing use on the Malheur National Forest or the Malheur National Wildlife Refuge.

Fifty-one percent of the Drewsey ES area is public land directly administered by BLM; an additional 4 percent in private ownership is also administered for grazing by BLM under exchange of use agreement.

In general, the capability of private lands to winter livestock exceeds the availability of public forage during spring and early summer. This creates a demand for increased forage production on public lands. Most private lands consist of native hay meadows with a very small amount of range land. Livestock are fed hay on or adjacent to the private meadows during winter months. There is a need to get cattle off the meadows in late March or April to prevent damage to the hay production and to avoid disease problems inherent on wet meadows.

Livestock distribution is influenced by season, topography, water, vegetation and class of livestock being grazed. Generally, yearlings and cows without calves tend to range further from water and over rougher terrain than do cows with calves. Cattle are selective grazers of vegetation when a free choice of different plants is available. In general, they prefer grasses over woody species during all seasons. A summary of cattle, sheep, horse, deer, and antelope diets and the degree of overlap is discussed in Section 2.13.2.1 below.

Calving usually occurs from February to May with the largest amount taking place on private lands. Calf crop ranges from 60-95 percent. Some operators leave the bulls with the cows year round resulting in various age calves.

Existing livestock grazing carrying capacity ranges from 60 acres per AUM in the big sagebrush sites with no understory grasses to 3 acres per AUM in the crested wheatgrass seedings. The high production of the seedings has been used to reduce grazing pressure on native range in some allotments. The seedings are normally fenced into small pastures and are generally watered by wells and pipelines. Water on the native range usually consists of reservoirs, springs, or creeks.

Almost all trailing is done on existing roads. Some trucking is done from private lands from the north end of the ES area to the crested wheatgrass pastures located to the south.

Grazing trespass is still a problem but much less than in the past when it was a major cause of overgrazing in the ES area. The greatest amount of trespass occurs from failure to move livestock from one field to another, and failure to gather all animals at the end of the season.

2.13.2.1 Livestock Forage Competition

Forage competition among grazing animals was studied by Vavra and Sneva (1978) on an area approximately 30 miles west of the ES area. They found that little dietary overlap existed between the grass consumers (cattle, sheep, and horses) and the shrub consumers (deer and antelope). The most severe dietary

overlap existed among cattle, sheep, and horses. Horse diets contained nearly 100 percent grass throughout the study. Cattle similarly preferred grass but diets in the summer and fall also contained 11 to 12 percent browse. Competition existed between cattle and deer for bitterbrush in the fall, when deer diets consisted of 96 percent bitterbrush. In the spring, antelope and deer diets consisted of 51 percent grasses but they grazed on different grass species than did horses and cattle.

2.13.3 Wild Horses

All unbranded horses in the ES area as of December 15, 1971, are considered wild, free roaming horses as defined in PL 92-195. Six herd management areas, as shown in Figure 2-14 and discussed in Table 2-14, currently contain the wild horses in the ES area. The boundaries of the herd areas were established using existing livestock grazing allotment boundaries, which do not necessarily conform with areas actually used by the horses. Presently there are approximately 110 miles of existing interior fences within the wild horse herd management areas of which 40 miles exclude wild horses from private lands (see Figures 1-1 and 2-14 for locations). Since the horses do not use the entire herd areas because of preference and/or habitat restrictions such as terrain, lack of water and/or desirable forage, the majority of these fences do not affect wild horses. These existing fences generally do not cause injuries because the horses have become accustomed to fence locations. See the Wild Horse Herd Management Plans on file at the Burns District Office for additional information concerning the wild horses in the ES area.

Competition for livestock forage exists between wild horses and cattle. Dietary overlap is discussed in Section 2.13.2.1.

2.13.4 Ecologically Significant Areas

There are no designated research natural areas within the ES area. A number of sites, identified by the Oregon Natural Heritage Program as being ecologically valuable, are located within the ES area (Table 2-15). Many are on public land. Figure 2-15 shows the approximate locations of these areas, as identified by the Oregon Natural Heritage Program (Nature Conservancy 1978).

Diamond Craters, a 17,000 acre area, is proposed for outstanding natural area status because of its geologic, botanical, and zoological significance.

Devine Canyon is currently managed as a VRM Class II area (see Section 2.11), and is managed as a Scenic Corridor Buffer Zone. Hatt Butte is managed as a VRM Class I area.

2.14 ECONOMIC CONDITIONS

According to the Planning Area Analysis (USDI, BLM 1977), the ES area includes about one-fifth of Harney County and, in 1970, had an estimated 1,050 rural

Table 2-14

Wild Horse Herd Management Areas

Herd Management Area	Horses Counted in 1976	Allotments Involved	Condition of the Horses
Kiger	11/76 - 34	5307, 5308	Healthy, reproductive
Riddle Mountain	11/76 - 87	5313, 5314, 5315	Healthy, reproductive
Smyth Creek	10/76 - 38	5307	Reproduction fair, colt survival poor 1/
Craters	12/76 - 19	5303, 5304, 5305, 5306, 5307, 5313, Diamond Craters	Static population
Middle Fork	8/76 - 36	5530, 5564, 5565	Healthy, reproductive
Stinkingwater	1/77 - 144	5531, 5532, 5535, 5566	Fair to good condition

1/ The cause of this poor condition is unknown.

Source: USDI, BLM. Bureau Planning Documents.

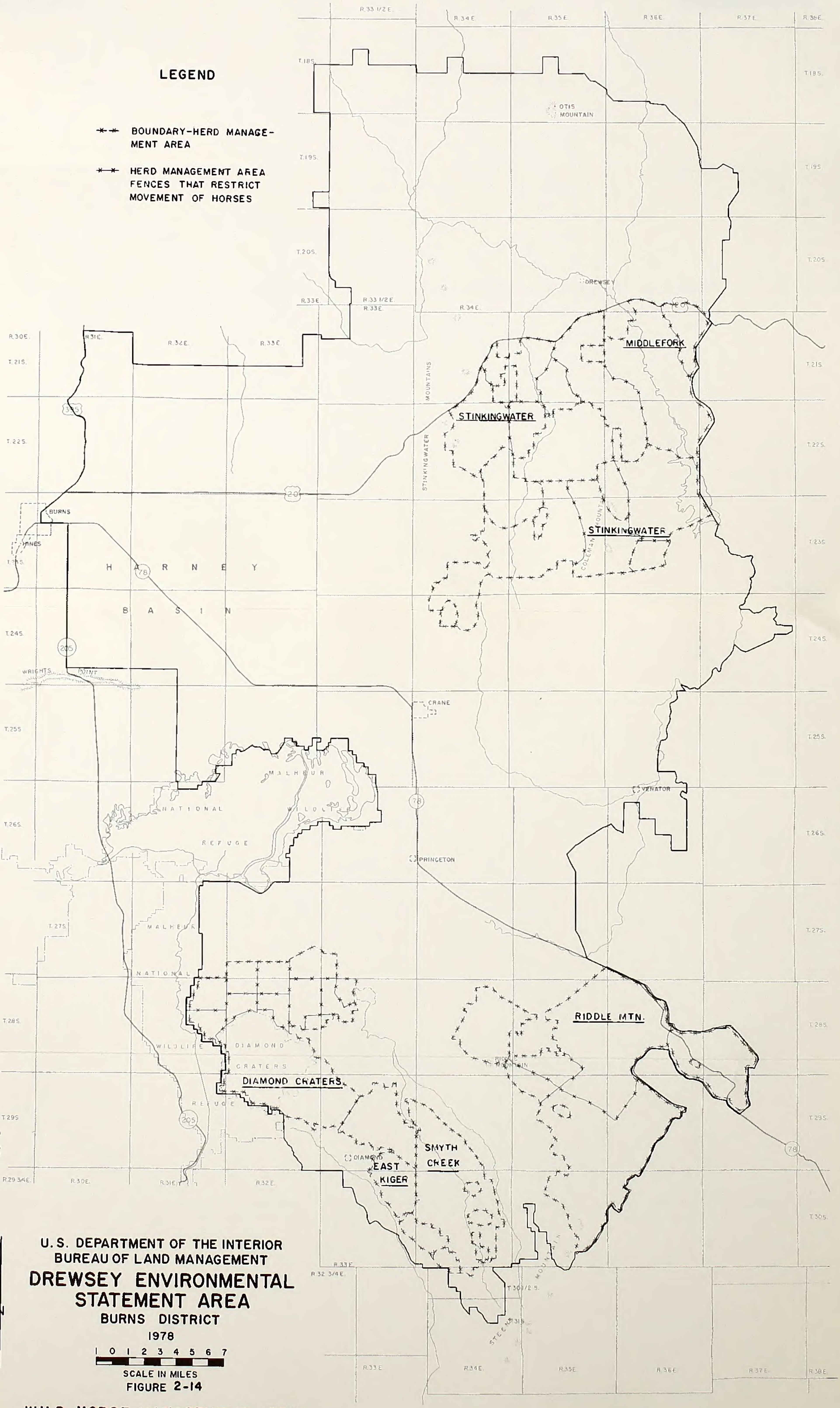


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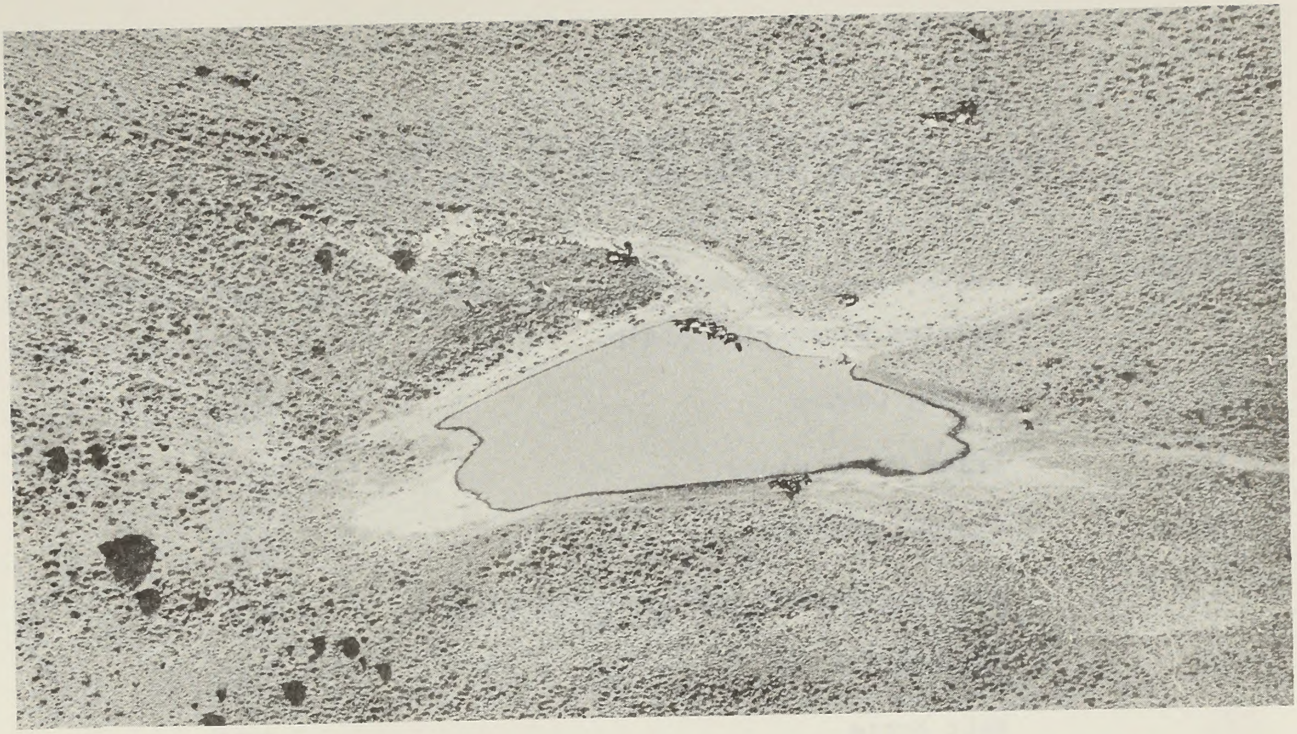
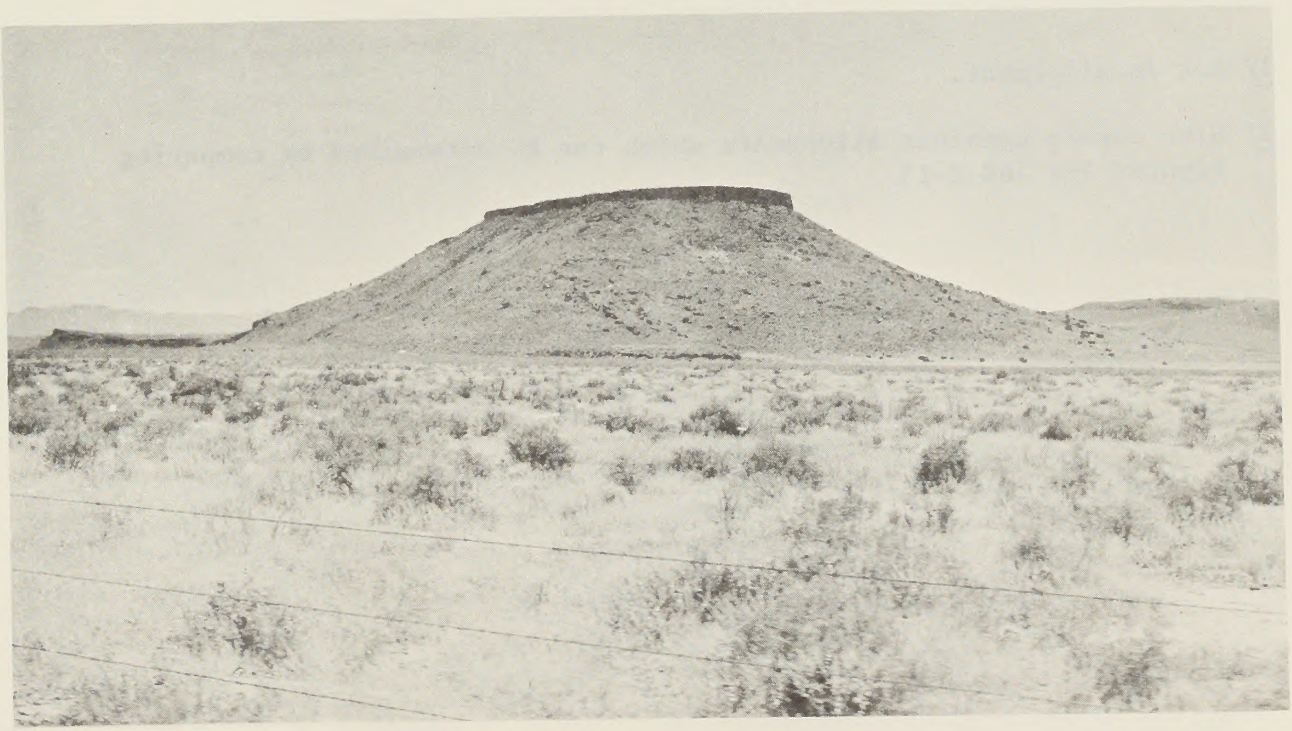
FIGURE 2-14

WILD HORSE MANAGEMENT AREAS



Wild horses in the Drewsey ES area



The top of Hatt Butte, which has remained ungrazed by livestock, is considered ecologically significant and is managed under VRM Class I objectives.

Table 2-15

Ecologically Significant Areas
(Identified by Oregon Natural Heritage Program)

Figure 2-15 Location	Area	Allotment
1.	Silvies River Floodplain	5002, 5003, 5004
2.	Devine Canyon	5109, 5101, 5113
3.	Crane Hot Springs	1/
4.	Diamond Craters	5318
5.	Stinkingwater Mountains (east slope)	2/
6.	Black Butte	5301
7.	Hatt Butte	5317
8.	Princeton Basalt Cliff	5325
9.	Summit Springs	5314

1/ Not in allotment.

2/ Site covers numerous allotments which can be determined by comparing Figures 1-1 and 2-15.

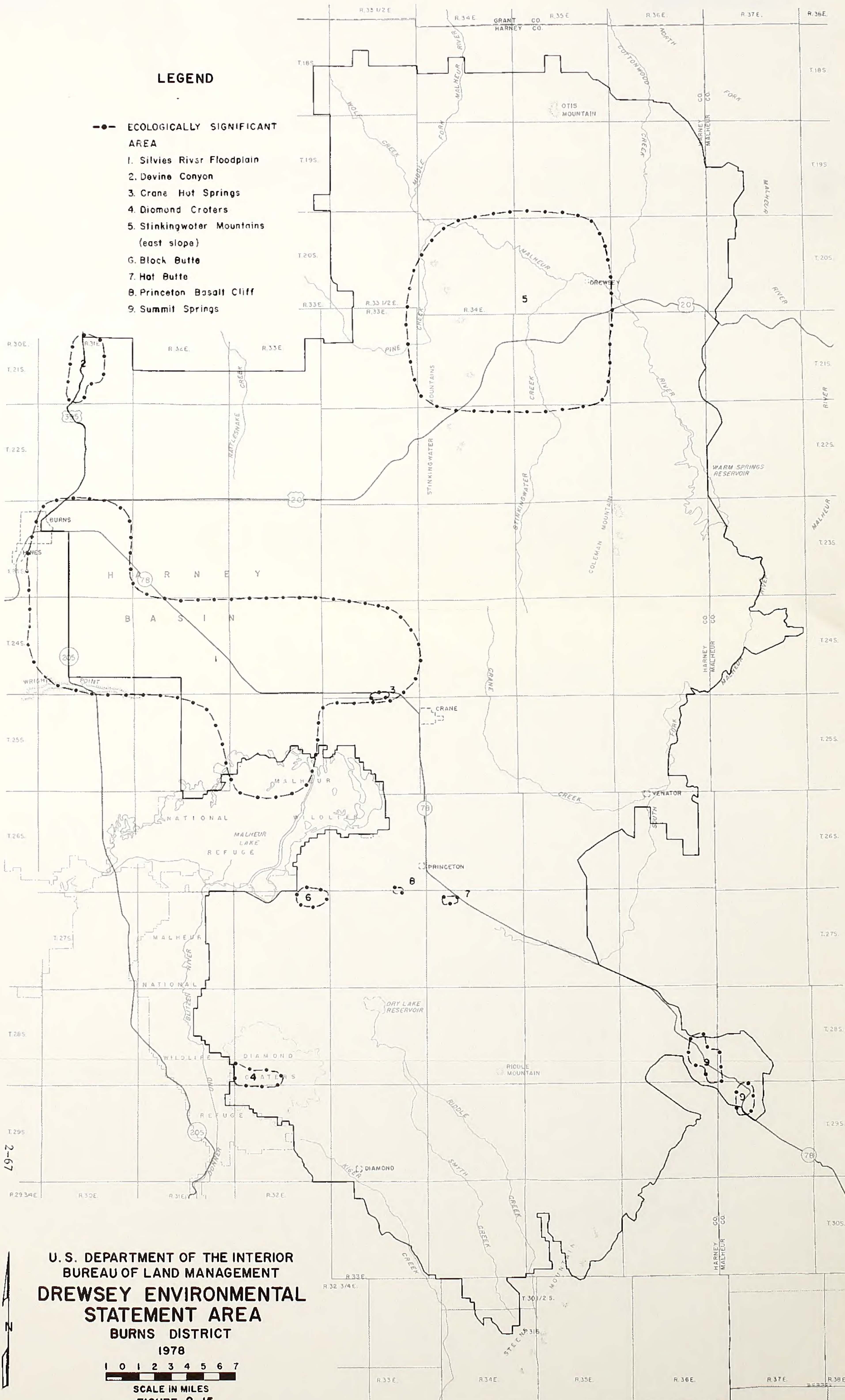


FIGURE 2-15
ECOLOGICALLY SIGNIFICANT AREA

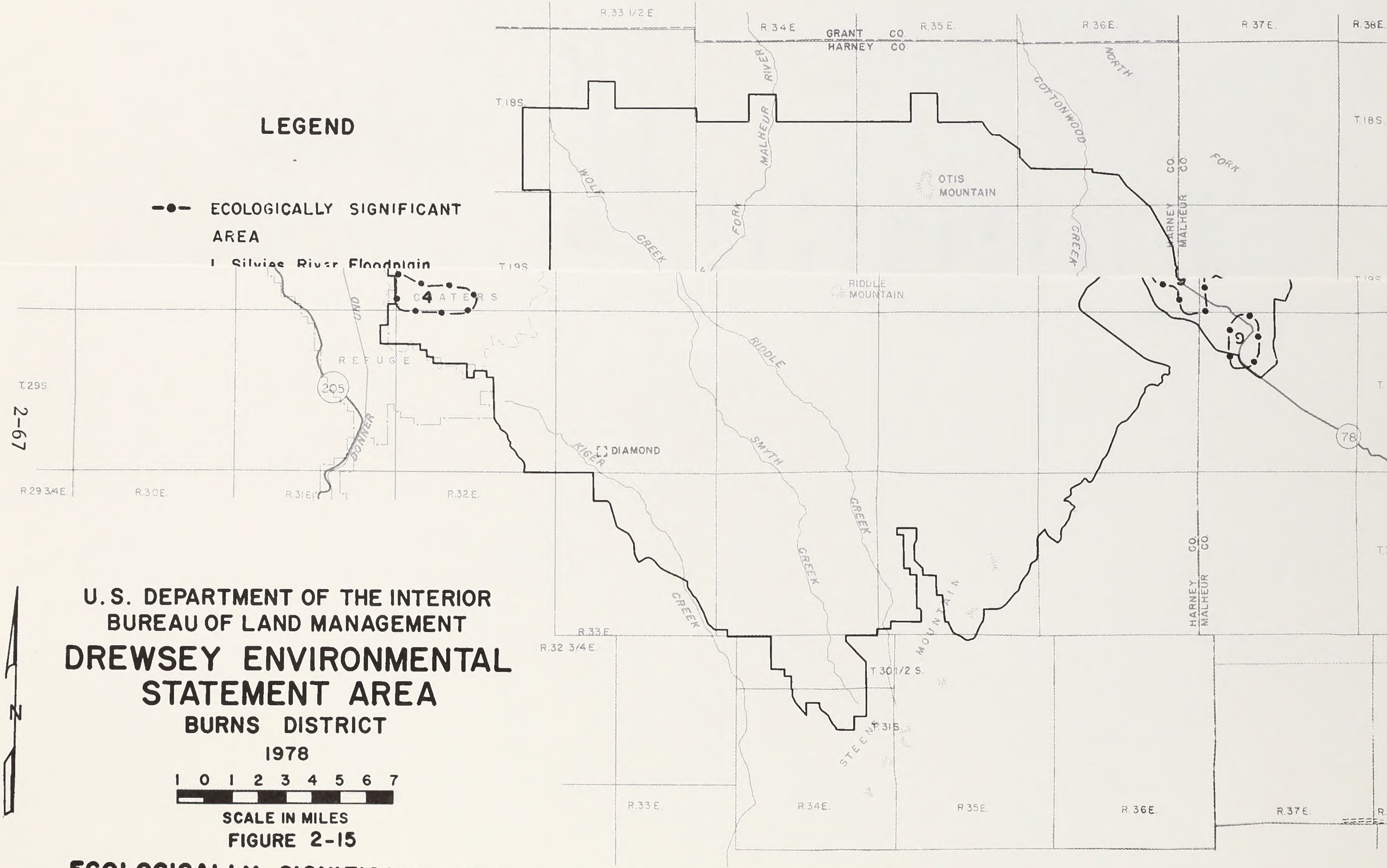


FIGURE 2-15
ECOLOGICALLY SIGNIFICANT AREA

and suburban residents (15 percent of the county population). This gave it a rural population density of 0.5 people per square mile.

From Burns and Hines, located in the Harney Basin on Drewsey's west boundary, the nearest urban center is 130 miles. Their relative sizes or distances from the ES area make other population centers insignificant or irrelevant to this discussion.

Although only about 15 percent of the county's population is classified as rural farm, agriculture is clearly a major contributor to the economic base in Harney County. This sector has secondary employment and income effects as well as deep roots into the community social and cultural structure. Agriculture accounts for approximately 20 percent of the employment within the county and is exceeded only by employment in the lumber and wood products sector. The livestock industry is estimated to employ 14 percent of the county's workers.

Approximately 70 percent of the farm units (ranches) in Harney County is devoted solely to livestock production. From cattle operations alone, the county derives 75 percent of the market value of agricultural products sold.

Cattle production is overwhelmingly the predominate source of agricultural income since nearly all crop production (hay) is fed to livestock. Although few of the operators in Harney Valley are heavily dependent on the public lands for livestock forage, permittees in the Drewsey ES area depend on public lands for an average of about 20 percent of their total forage requirements.

2.14.1 General Description of Agriculture in Harney County

The 1974 Census of Agriculture provides a general description of agriculture within Harney County. In 1974, the average farm size was 5,982 acres and the average value per farm for land and buildings was $551,500 or $92 per acre. Nineteen percent of the privately owned land was classified as rangeland and, significantly, only 3 percent of all the land in Harney County was used for crop production. Crop production, excluding alfalfa hay, is not generally considered to be an economically feasible substitute for livestock production because of the short growing season.

In 1974, of the 238 ranches, 129 were operated by full owners, 91 by part owners, and 18 by tenants. The average age of the operator was 52 years and the average family size was 3.2 persons. Ninety percent of the operators lived on the ranch they operated and two of every three operators worked exclusively on the ranch while 18 percent worked off the ranch more than 200 days. Eighty percent of the operators reported ranching as their principal occupation.

Cattle operations account for 95 percent of the market value of all livestock sales and 75 percent of all agricultural sales. Over 80 percent of the ranch units had an inventory of more than 100 cattle and calves and nearly 40

percent of the operations had more than 500. Those larger operations accounted for 80 percent of the cattle and calf inventory in the county.

Table 2-16 displays the distribution of livestock forage use on public lands within the Drewsey ES area in 1974. Average herd size was almost 400 cattle (excluding animals less than six months of age) and the operators depended on public lands to supply an average of 20 percent of livestock forage requirements.

According to Bostwick, Schultz, and Rodewald (1975), " ... it is purported that for a livestock operator to compete in today's [1970] industry a minimum herd size of 300 brood cows is necessary, particularly if livestock production represents the only source of farm and family income. Herd levels much below this figure would then require substantial income from outside sources, supplemental types of agricultural production, or both." This may partially explain why almost 20 percent of the operators in Harney County worked off the ranch more than half-time to supplement their incomes.

2.14.2 Population

Harney County's population (7,700 in 1977 according to Portland State University) has been relatively stable and is projected to increase at a much slower pace than Oregon's. This would increase the disparity between Harney County's population density (only 0.7 persons per square mile in 1970) and Oregon's (21.7 persons per square mile).

In 1977, approximately 70 percent of the county population resided in either Burns or Hines, which had estimated populations of 3,675 and 1,665 respectively (Portland State University 1978). The only urban center in Harney County (Burns and Hines) showed a 2.1 percent average annual increase in population from 1971 to 1977.

2.14.3 Employment

Harney County's employment characteristics are presented in Table 2-17. According to the Census of Population (U.S. Bureau of Census 1972), Harney County had the lowest nonworker to worker ratio (1.27) in Oregon. More than 93 percent of the males between the ages of 18 and 24 were in the labor force compared to about 71 percent in Oregon. Harney County also had a much higher percent of males 65 and over in the labor force (42 percent) than Oregon (22 percent). Finally, a smaller percentage of employed persons worked in white collar occupations (35 percent) than Oregon's 48 percent and nearly everyone worked in the same county as their residence. Less than 1 percent worked outside their county of residence compared to 16 percent for the State.

Unemployment and underemployment are characteristically high in Harney County. This is caused in part by the seasonal nature of agriculture and the instability of lumber and wood products employment. Based on a 3-year average

Table 2-16

Distribution of Operator's Dependency on Livestock Forage From Public Lands, 1974

No. of Operations	Size of Herd Reported1/	Percent of Operations This Size2/	Total Cattle Numbers3/	Annual Forage Requirement (AUMs)	Licenced AUMs Drewsey ES Area	Dependency of Use (Percent of Forage from BLM Administered Public Lands, Drewsey ES Area)
9	100 or less	11	665	7,980	1,550	19.4
23	101-200	28	3,670	44,040	7,014	15.9
12	201-300	14	3,160	37,920	6,877	18.1
12	301-400	14	4,257	51,084	9,602	18.8
9	401-500	11	4,107	49,284	10,015	20.3
7	501-600	8	3,974	47,688	13,483	28.3
6	601-1000	7	4,210	50,520	11,436	22.5
6	1000 or more	7	8,952	107,424	17,528	16.3
Total 84		100	32,995	395,940	77,505	19.6
Summary						
56	Less than 400	66.7	11,752	141,024	25,043	17.8
28	More than 400	33.3	21,243	254,916	52,462	20.6

1/ Information is reported on applications.
2/ This table is based on cattle use. Sheep and horse use was converted to cattle use.
3/ Does not include calves less than 6 months of age.

Source: USDI, BLM, Burns District. Planning Area Analysis, 1977.

Table 2-17
Average Annual Total Employment and Unemployment
1972-1976

	1972	1973	1974	1975	1976	1977	Average Annual Rate of Change (percent) 1/
Harney County							
Civilian Labor Force	3,520	3,590	3,610	3,700	3,680	3,840	1.8
Total Employment	3,330	3,370	3,310	3,310	3,310	3,510	1.1
Unemployment	190	220	300	390	370	320	11.0
Percent of Labor Force	5.4	6.1	8.3	10.5	10.1	8.4	--
Oregon							
Civilian Labor Force	959,300	1,001,000	1,015,000	1,040,000	1,070,000	1,126,000	3.4
Total Employment	893,700	939,000	939,000	929,000	968,000	1,043,000	3.1
Unemployment	65,600	62,000	76,000	111,000	102,000	83,000	4.8
Percent of Labor Force	6.8	6.2	7.5	10.6	9.5	7.4	--
United States							
Percent of Labor Force Unemployed	5.6	4.9	5.6	8.5	7.7	7.0	--

1/ Compounded annual rate of change.

Sources: Oregon Department of Human Resources, Employment Division, Oregon Resident Labor Force, Unemployment and Employment 1971-1976 (also for each county). Salem, Oregon, 1972-1978.

U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 24, No. 4, April 1977.

(1974-1976), monthly variations in total employment showed a 19 percent difference between the highest (summer) and the lowest (winter) monthly to annual total employment. By comparison, Oregon displayed only a 9 percent difference over the same period.

Table 2-18 displays 1974 employment and earnings by industry. In 1970 approximately 22 percent of the county's male workers and 8 percent of the female workers were employed in agriculture. About 70 percent of the rural farm population and 15 percent of the rural nonfarm population were employed in agriculture. Of the rural farm population, approximately 20 percent of the males and 60 percent of the females were engaged in nonfarm employment.

In 1970, 87 percent of the rural farm males and 34 percent of the females participated in the labor force. A breakdown of 1970 agricultural employment indicates that 56 percent of the males were wage and salaried workers, 42 percent were self-employed, and 2 percent were unpaid family members. Forty-seven percent of the 77 females received wages or salaries. The rest were self-employed (U.S. Bureau of the Census 1972). This situation has probably changed very little. In 1974, an estimated 430 persons were employed in the livestock industry in Harney County (USDI, BLM 1978d). Based on a breakdown of 1974 AUM production in the county, primary employment that depends on livestock grazing on public lands in the Drewsey ES area was equivalent to approximately 38 full-time jobs (76,348 AUMs X $5.65 earnings per AUM = $431,366. This is divided by $11,500, the 1974 average earning per livestock employee is Harney County. Thus, $431,366 ÷ $11,500 = 38 full-time equivalent jobs). The county livestock employment multiplier is 1.30 which means each job in the livestock industry generates enough business activity to support the equivalent of three-tenths of one additional full-time job. Thus the equivalent of approximately 50 full-time local (direct plus indirect) jobs are dependent upon livestock grazing on public lands within the ES area.

2.14.4 Income

Analysis of Harney County's income characteristics also helps to describe the county's general economic conditions. Table 2-20, which presents the relative size and importance of earnings by industry, shows that the livestock sector is the second largest in the county in terms of earnings but fourth in terms of employment.

The 1974-76 average authorized use on Drewsey public lands was 76,348 AUMs. Based on an average 20 percent dependency on BLM forage (Table 2-16), permittees had an estimated total livestock forage requirement of 381,740 AUMs.

Since 1976 significant changes have occurred in the livestock industry. In 1977, lack of precipitation caused most of eastern Oregon to experience below average forage production. This caused livestock use to be reduced on public lands to 64,550 AUMs. The 1978 permitted use was approximately 65,753 AUMs. Equally significant changes have occurred in livestock market conditions. For example, although 1977 calf prices were fairly similar to 1976

Table 2-18

Harney County Employment and Earnings by Industry (1974)

Industry	Earnings Amount ($1,000)	Earnings Percent	Employment People	Employment Percent
Agriculture				
Livestock (Excluding Dairy-Poultry)	4,944	16	430	14
Other agriculture	2,254	7	138	4
Contract Construction	442	1	36	1
Manufacturing				
Lumber and Wood Products	8,260	26	750	24
Other Manufacturing	1,464	5	91	3
Transportation and Communication	756	3	56	2
Public Utilities	212	1	18	1
Wholesale and Retail Trade	3,736	12	478	15
Finance, Insurance, and Real Estate	350	1	38	1
Services	1,826	6	201	6
Government				
Federal	2,929	9	265	8
State and Local	4,154	13	669	21
Total	31,326	100	3,170	100

Source: USDI, BLM. Social Economic Data System - Dynamic Regional Analysis Model (DYRAM). 1978

prices, by July 1978 average prices in Oregon rose from an average 1977 price of 35 cents per pound to 53 cents per pound (USDA, Oregon Crop and Livestock Reporting Service, July 15, 1978).

Table 2-19, displays total agricultural sales, cattle and calf sales, and direct livestock earnings per AUM. The average direct earnings per AUM between 1971-76 were $5.65. Direct income from the 1976 use on Drewsey public land would have been an estimated $431,400. This declined to an estimated $364,700 in 1977, and $371,500 in 1978.

The livestock industry income multiplier is 1.312 which means each dollar of income in the livestock industry generates an additional $.31 of income in the general economy (USDI, BLM 1978d). Therefore, total (direct plus indirect) local income generated by livestock grazing on public lands within the ES area is estimated to have been $565,000 in 1976, $478,000 in 1977, and $487,000 for 1978.

2.15 SOCIAL CONDITIONS

This description of the social environment primarily reflects the responses of 21 persons interviewed in a non-random and unstructured survey (Centaur Associates, Inc. 1978). Of the 21 people interviewed, 19 live or work in Harney County, and 10 of these are ranchers whose cattle graze on Drewsey public lands. All but one of the ten ranchers lives in the northern portion of the ES area, near the community of Drewsey. In addition, previous social studies of the area were used for background information.

The social environment of the Drewsey ES area is affected chiefly by five elements: 1) climate; 2) Federal ownership of 73 percent of the land in the county; 3) a history of livestock production as the major economic activity; 4) long distances to major urban centers; and 5) the predominance of a ranching culture (Harney County Planning Commission 1972).

Federal land management decisions are important to the local population, many of whom view livestock production as a way of life and see no productive alternative use for rangeland other than grazing and traditional recreational uses (e.g., hunting, hiking, etc.).

The social and attitudinal characteristics of the population are relatively cohesive (Grigsby 1976). The ranching sub-culture perceives itself as characterized by the traditional strengths and values associated with the "pioneer spirit": independence, rugged individualism, adaptability, practicality, and enjoyment of the variety of types of labor and the direct contact with nature which ranching provides. Ranchers perceive themselves as free-spoken and place a great value on plain speech, practicality and common sense. They believe their experiences, values, and attitudes are often at odds with "big government," which, as they generally perceive it, neither understands nor shares their values and interests.

Table 2-19

Estimated Direct Earnings from Livestock in Harney County

Year	Values of Agricultural Commodity Sold A Cattle & Calves ($1,000)	Values of Agricultural Commodity Sold B Total Agriculture ($1,000)	Ratio A/B	Agricultural Earnings Total ($1,000)	Agricultural Earnings from Livestock ($1,000)	Beef Cow AUMs (1,000)	Livestock Earnings per AUM
1969	8,923	9,992	.893				
1970	8,171	9,616	.850				
1971	8,090	9,343	.866	3,477	3,011	696	4.32
1972	10,902	12,027	.906	5,634	5,104	720	7.09
1973	13,415	14,795	.907	9,172	8,319	768	10.83
1974	6,896	8,900	.775	4,167	3,229	840	3.84
1975	9,899	11,729	.844	2,730	2,304	864	2.67
1976	9,108	11,017	.827	4,801	3,970	768	5.17
1977	12,823	14,623	.877	na	na	720	na

Source: Oregon State University, Extension Service
Extension Economic Information Office, Oregon State University, from USDA and other government reports July 12, 1978
Economic Information System - Bureau of Economic Analysis

The economic viability of Harney County is closely linked to the cattle-raising industry and local businesses are vitally aware of their dependence on the well-being of the ranchers. Consequently, the community is both economically and socially aligned with the ranching culture.

2.15.1 Major Issues

The management and local use of public lands is perceived as essential and is widely discussed by residents, especially ranchers. The following issues were of primary concern.

2.15.1.1 Future of the Ranching Lifestyle

The future of the ranching lifestyle, as it is known today, is a predominant concern among ranchers. There was a concensus among those interviewed that a number of factors, including current government policies, economic trends and the acquisition of ranches for tax shelters and investment purposes, contribute to make independent ranching an increasingly difficult way of life to sustain. In general, it was felt that a number of marginal operators are in the process of either being forced to sell out or to make major changes in operation. Some operators have attempted to maintain economic stability through individual (e.g., changing size or type of enterprises) or collective efforts (e.g., joining grazing cooperatives).

2.15.1.2 BLM Management and Planning

The size and power of government was commonly mentioned as a local concern. The area is subject to an extremely strong influence of governmental resource management of the range, timber, wildlife, and to a lesser extent, minerals. BLM grazing management is often viewed in conjunction with other agencies' management policies, e.g., wildlife, timber or range management, as limiting the self determination of local residents.

Examples of perceived inefficient or counterproductive BLM policies or practices included:

The waste of money on the administration of environmental impact statements. (It was generally felt that funds could be more constructively used for fencing or reseeding.)

The waste of time in implementing range improvements during the ES process.

The livestock grazing reductions that are not believed to have been accompanied by range improvements.

The weakening of local property values due to the past reduction of livestock AUMs on Federally administered lands.

The repetition of mistakes because BLM doesn't assess the impacts of actions and policies.

The focus of local frustrations over policies and management is generally aimed at "big government," and not at the local office. Respondents felt that policies are formed at the national level rather than at the local BLM office.

2.15.1.3 Other Issues

There appeared to be a general belief that nonlocal environmentalists, who are not knowledgeable about local range conditions and issues, strongly influence government policy and management decisions. Another concern was that there is an overall trend among government agencies (FS, FWS, and BLM) toward reducing livestock grazing. Finally, some fear was expressed that grazing on public lands may eventually be eliminated.

CHAPTER 3

Impacts of the Proposed Action

3

3. IMPACTS OF THE PROPOSED ACTION

This chapter is an analysis of the significant impacts of the proposed action upon the various resources described in Chapter 2. The implementation of intensive management consists of three major actions which cause impacts: forage allocations, grazing systems and range improvements. Since these actions do not apply to the less intensive management allotments (18,553 acres), the driveway allotment (1,680 acres) and unallotted areas (21,032 acres), it is assumed that continuation of these portions of the proposed action would not result in any significant impacts. Therefore, these will not be discussed further.

Analysis indicates that there would be no significant impacts upon climate, air quality, geology, and topography. Impacts on agriculture have been incorporated into the sections on livestock grazing and economics.

Each impact is analyzed in a cause and effect manner and secondary impacts are identified and traced to the extent they can no longer be identified with the proposed action. Each cause identified is tied to a component of the environment (Chapter 2).

Impacts are assessed at the short term and at the long term. The short term is a period from 1 to 5 years, the time needed to complete the range improvement projects and implement all allotment management plans (AMPs). The long term is a period of 10 years after full implementation, for a total of up to 15 years.

The following are general assumptions. Assumptions specific to a given resource are presented with that resource section in this chapter.

- The proposed action would be implemented over a 5-year period following completion of the ES.

- The BLM would provide the funding as outlined in Chapter 1, Section 1.3.1 to implement the proposed action within the stated timeframe.

- Monitoring studies would be completed as indicated and AMPs would be followed.

- The principal resource directly impacted by the proposed action would be vegetation. Any changes in vegetation production, composition, condition, trend, and ground cover would affect other resources.

- Total projected AUMs as shown in Table 1-2 would be achieved within 10 years after full implementation of the proposal.

- All impact analysis in this chapter will reflect consideration of all range improvement design features and construction stipulations outlined in Chapter 1, Section 1.2.2.2.

3.1 IMPACTS ON VEGETATION

3.1.1 Introduction

This section will discuss and analyze the expected changes in plant vigor and reproduction caused by the proposed action. Actions which enhance a species' vigor and reproduction cause an increase in the number and size of that species in a plant community. Conversely, if the action adversely affects a plant's vigor and reproduction, the species affected will decrease amount and size in composition in the community. (Throughout this section, this occurrence will be referred to as increase or decrease in composition.)

Livestock diets in the Drewsey area are largely composed of grasses (Vavra and Sneva 1978); therefore, these plants as a group would be impacted most by the proposed action. There are also a few other herbaceous and woody species which are preferred by cattle. For the purpose of this analysis, all these plants will be referred to as desirable species. There are a number of other plants not normally grazed by livestock either due to growth characteristics or lack of palatability, which will be referred to as undesirable species. Table 3-1 is a list of the most common plants in these two groups.

The classification of a species as either desirable or undesirable relates only to a plant's value as livestock forage. As such, this classification does not indicate a species' value for other uses. For example, basin wildrye, which is listed as desirable for livestock, is not considered valuable for mule deer. Conversely, many species preferred by mule deer are not considered desirable as livestock forage.

For purpose of analysis, it is assumed that available nutrients, primarily water, are now essentially fully utilized by the present vegetation. Consequently, any increase or decrease in the amount of the desirable species would result in an equal but opposite change in the composition of the undesirable species within the vegetative community.

Specific changes in plant composition within the 10 vegetation communities will not be discussed by community because quantitative data are lacking. Changes in composition in all communities but the riparian and greasewood are expected to be similar because the other eight communities contain many of the same desirable and undesirable species.

These expected changes in plant composition will then be used as a basis for projecting changes in range condition, forage production, vegetative ground cover, and threatened and endangered (T&E) plants. A summary of impacts is presented on Table 3-5. An understanding of the interrelationship of locations of plant communities relative to allotments and the proposed action may be obtained by consulting Tables 1-2, 1-3, 1-6 and Figures 1-1, 2-3 (Vegetation Communities), and 2-4 (Riparian Vegetation).

Table 3-1

Common Desirable and Undesirable Plants

Desirable Plants		Undesirable Plants	
Common Name	Scientific Name	Common Name	Scientific Name
Bitterbrush	Purshia tridentata	Tarweed	Amsinkia spp.
Willow	Salix spp.	Low sagebrush	Artemisia arbuscula
Clover	Trifolium spp.	Stiff sagebrush	Artemisia rigida
Sweetclover	Melilotus spp.	Big sagebrush	Artemisia tridentata
Crested wheatgrass	Agropyron cristatum	Rabbitbrush	Chrysothamnus spp.
Bluebunch wheatgrass	Agropyron spicatum	Juniper	Juniperus spp.
Sedge	Carex spp.	Greasewood	Sarcobatus vermiculatus
Basin wildrye	Elymus cinereus	Loco weed	Astragalus spp.
Idaho fescue	Festuca idahoensis	Larkspur	Delphinium spp.
Rush	Juncus spp.	Wild Iris	Iris spp.
Junegrass	Koeleria cristata	China lettuce	Lactuca spp.
Nevada bluegrass	Poa nevadensis	Peppergrass	Lepidium spp.
Kentucky bluegrass	Poa pratensis	Lupine	Lupinus spp.
Sandberg bluegrass1/	Poa secunda	Scorpion weed	Phacelia spp.
Needlegrass	Stipa spp.	Dock	Rumex spp.
		Russian Thistle	Salsola kali tennifolia
		Tumblemustard	Sisymbrium altissimum
		Thistle	Cirsium spp.
		Dandelion	Taraxicum officinales
		Yarrow	Achillea lanulosa
		Mullein	Verbascum thapsus
		Deathcamas	Zygadenus spp.
		Cheatgrass	Bromus tectorum
		Medusahead rye	Taenatherum asperum
		Sixweeks fescue	Festuca octoflora

1/ Desirable only on shallow soils of the stiff and low sagebrush communities

3.1.2 Impacts to Vegetation Composition

This section will analyze the expected changes in plant composition within the 81 allotments proposed for intensive management. Because these changes are caused by the three components of the proposed action (forage allocation, grazing system, and range improvements) a brief description precedes the analysis of each component.

3.1.2.1 Forage Allocation

The initial forage allocation would reduce livestock grazing by 8,442 AUMs in order to allocate the total available forage of 79,167 AUMs among livestock, wildlife, wild horses, and watershed as shown on Table 1-2.

Livestock grazing use would be increased an average of 18 percent on 8 of the 81 allotments proposed for intensive livestock management. Forage allocation on 40 of the remaining allotments would be reduced by an average of 17 percent. The amount of livestock use on the remaining 33 allotments would be unchanged.

As Allotment Management Plans (AMPs) are implemented, the projected total forage production of 101,773 AUMs is expected to become available. This would be an increase of forage of 22 percent (22,606 AUMs) above the 1976 level of 79,167 AUMs.

Both the initial and projected forage allocations were determined under the assumption that grazing use of the key species would occur very near the level of utilization outlined for each grazing system (See Chapter 1, Section 1.2.2.1). Since the level of utilization varies by system, the system strongly influenced the proposed allocations.

3.1.2.2 Grazing Systems

All of the six proposed types of grazing systems are now in use within some of the allotments in the ES area. No change in grazing system is proposed for 63 allotments. One or more of the new grazing systems would be implemented on the remaining 18 allotments.

In general the proposed action would result in fewer allotments with a continuous grazing system (Existing: 29 allotments/Proposed: 14 allotments) and more with either deferred rotation (Existing: 24 allotments/Proposed: 33 allotments) or rest rotation (Existing: 25 allotments/Proposed: 30 allotments) (Table 1-3).

In any grazing system, the most important consideration is to have the proper number of livestock graze a particular portion of rangeland (Stoddart, Smith, and Box 1975, p. 298).

The proposed forage allocation is expected to meet this criterion by reducing the grazing use of the key forage species (Table 1-5) to the levels specified for each grazing system proposed. With less livestock use, the desirable plants would be grazed less than at present. This in turn would make the proposed grazing systems more effective by allowing more desirable plants to meet their growth requirements.

The following analysis identifies the general changes in composition of the desirable species that are expected to result from the forage allocation and each type of system. Since significant composition changes normally take more than 1 year, no short-term impacts to vegetation are expected. Therefore, the following analysis is confined to discussion of long-term impacts.

Estimates of changes in composition of desirable species were based upon professional judgment, analysis of similar systems elsewhere, and cited

studies. Much of this data is believed to be applicable since it concerns similar actions and types of vegetation.

Continuous Grazing System

Continuous grazing would occur on 67,044 acres, or 11 percent of the public lands in the ES area. Continuous use results in grazing of the desirable species during late spring period. Grazing use at this time is most critical to plant health (Cook 1971).

The continuous use system often results in uneven grazing within an allotment. Factors such as terrain, location of fences and water, and vegetation communities can result in heavy grazing (75 percent of the annual vegetation production) in one portion of an allotment and light use (25 percent) in another area.

It is estimated that 20 percent of the area (13,400 acres) including 28 acres of riparian habitat (Figure 2-4) would receive heavy use. This degree of use would prevent the desirable species from fully replenishing the food reserves necessary for maintaining vigor and reproduction. Ultimately, continuous use would result in the death of the desirable species on these concentration areas. They would be replaced by undesirable species such as cheatgrass, sagebrush and Russian thistle on uplands; and wild iris, thistle, yarrow and dandelion on riparian areas.

On the remaining 53,600 acres, utilization of the desirable species would not exceed 50 percent of their annual production. This level of utilization, or higher, is presently occurring on continuous grazing systems covering 62,751 acres. Approximately 51,000 of these acres are in good condition or have an upward trend. In addition, studies at the Squaw Butte Experiment Station (which is approximately 30 miles west of the ES area) indicate that this degree of use would allow the desirable species an opportunity to maintain vigor, reproduce, and increase their composition in the various vegetation communities (Hyder and Sawyer 1951).

Conclusion

The continuous grazing system and forage allocation would increase the composition of the desirable species on the 53,600 acres receiving moderate and light grazing use. On the remaining 13,400 acres, including 28 acres of streamside riparian habitat, continuous use would reduce the composition of the desirable species.

Deferred Grazing System

Deferred grazing would occur on approximately 94,300 acres of public land including 81 acres of riparian vegetation (Figure 2-4). Desirable species (as shown in Table 3-1) on native range areas would be grazed up to a maximum of

70 percent of annual production. On crested wheatgrass ranges, up to 80 percent of annual production would be used.

There are two exceptions to this level of use within the 94,300 acres. Grazing use of 320 acres in Allotment 5506 would be limited to 50 percent of the desirable species on the 4 acres of riparian vegetation in the allotment (Table 1-4). All livestock grazing would be excluded from 1,763 acres (including 35 acres of riparian vegetation) in Allotments 5315 and 5530. (See Table 1-8 for a list of allotments where livestock grazing would be excluded).

The deferred system would result in grazing after most of the desirable species have completed growth. Because of water, fences, vegetation, and terrain characteristics it is estimated that heavy grazing would occur on 5 percent of the area (4,600 acres which includes 42 acres of riparian vegetation). The remaining area, including 16 acres plus 4 acres of riparian vegetation in Allotment 5506, would be grazed at a light or moderate rate (less than 50 percent of annual production).

On the 4,600 acres grazed heavily (60-70 percent), vigor and reproduction of desirable herbaceous species would be decreased (Cook 1971). In addition, after grasses mature, utilization of shrubs by livestock increases (Vavra and Sneva 1978). Some woody shrub species such as bitterbrush, willow, and alder are damaged when grazed heavily in the fall because stored food reserves are lost.

Where palatable shrubs are in limited numbers, individual shrubs would be selected by cattle and heavily browsed, resulting in decreased forage production and eventual death of these plants. The critical growth period for woody riparian species occurs in late summer. Since livestock normally concentrate in riparian areas, both the vigor and reproduction of woody riparian species would be adversely impacted by removal of vegetation under the deferred grazing system.

In livestock concentration areas, reproduction of all desirable species would be hindered by annual grazing since most seedlings are easily damaged by trampling and close grazing for 2 years following germination. In other areas, most plants would not be greatly impacted and would be expected to be established successfully.

On the remaining areas where grazing use would be moderate or light, food reserves needed to maintain plant health would be replenished every year. As a result, desirable herbaceous species would remain vigorous (Stoddart, Smith and Box 1975, p. 135).

Moderate grazing (50 percent of annual production) of shrubs encourages growth of additional twigs and therefore increases forage production. Reproductive capacity, on the other hand, is decreased over the years, since increased twig growth reduces the development of flowers and fruits (Garrison 1953 Cited by Stoddart, Smith, and Box 1975, p. 135).

Deferred grazing at moderate or higher levels of utilization is now occurring on 96,592 acres. Eighty percent of that area (77,300 acres) is in good condition or has an upward trend. Therefore, it is expected that deferred grazing would increase the composition of desirable species.

On areas where all livestock grazing would be excluded, all desirable species would increase in vigor and reproduce. For the first few years, the most vigorous plants, including many annual species, would dominate the vegetation community. Eventually, after 10 to 20 years, species such as bitterbrush, willow, bluebunch wheatgrass, Idaho fescue, basin wildrye, Kentucky bluegrass and needlegrass that are normally found in the potential community would assert dominance. After that time, changes in species composition would occur slowly year to year, until the potential community is reached.

Conclusion

In general, the deferred system would increase the composition of the desirable herbaceous species on 87,895 acres, including 4 acres of riparian vegetation, where livestock grazing would be moderate or light. Desirable woody species would also increase but more slowly.

On the 4,600 acres, including 42 acres of riparian vegetation, where grazing would be heavy the composition of both desirable herbaceous and woody species would be reduced.

On the 1,763 acres, including 35 acres of riparian vegetation, where grazing would be excluded the composition of both the desirable woody and herbaceous species would be increased.

Rotation Grazing System

Rotation grazing would occur on approximately 58,170 acres of public land including 16 acres of riparian vegetation along streams and reservoirs (Figure 2-4). Desirable species (Table 3-1) on native range areas would be grazed up to 50 percent of their annual vegetation production. Crested wheatgrass would be grazed to remove 70 percent of its annual forage production. Grazing use would remain heavy on the 12 acres of riparian vegetation.

Livestock grazing would be excluded from 360 acres within the portion of Allotment 5529 proposed for rotation grazing. Four acres of riparian vegetation are also included within the exclusion area.

Rotation grazing results in the desirable species being grazed during part of the growing season every year. However, grazing use of crested wheatgrass would never occur during the latter part of the growing period and would only occur during this critical period every other year on native ranges.

On native ranges and the 12 acres of riparian vegetation, the grazing scheduled during the critical period under this system would be alternated with early spring grazing the following year. The early spring grazing would end in time for the desirable species to replenish food reserves (see Early Grazing System). As a result, the decline in vigor caused by use during the critical part of the growing season is somewhat offset by early grazing in alternate years.

The rotation grazing system is not expected to enhance the reproduction of the desirable species on native range because every pasture is grazed each year. Many new seedlings would be grazed or pulled up before becoming established.

Rotation grazing at moderate or higher levels of utilization is now occurring on 43,785 acres. Eighty-two percent of that area (35,900 acres) is in good condition or has an upward trend. Consequently, it is expected that this system would produce a long-term improvement in vegetation production, reproduction, and composition of desirable species on native ranges.

Desirable herbaceous species in riparian areas are expected to remain in poor vigor because of heavy grazing use every year during the growing season. Woody riparian species would improve in vigor because they are normally not grazed by livestock during the spring and early summer season (Vavra and Sneva 1978).

On crested wheatgrass ranges, this system consists of a short period of use early in the growing period and a short period of grazing in the fall. This type of grazing is expected to maintain the vigor of crested wheatgrass (Sharp 1970). Reproduction of crested wheatgrass would be hindered by rotation grazing because the high degree of utilization in spring and lighter use in fall would result in most seedlings being grazed, pulled up, or trampled before establishment. As a result very little, if any, change in percent composition, forage production and reproduction of crested wheatgrass ranges is expected on areas where this system is proposed.

The desirable species within the 360 acres where grazing would be excluded would increase as described under Deferred System.

Conclusion

The rotation grazing is expected to increase the composition of desirable species native ranges. Riparian herbaceous species on 12 acres, however, would not increase. Little change in composition is expected in crested wheatgrass seedings.

Significant increases in composition of all desirable species are expected on the 360 acres excluded from grazing.

Deferred Rotation System

Deferred rotation grazing would occur on approximately 245,329 acres of public land including 78 acres of riparian vegetation in the ES area.

Livestock grazing utilization would be limited to 50 percent of the desirable riparian species on 1,840 acres including 16 acres of riparian vegetation (Table 1-4). In addition there are 489 acres, including 28 acres of riparian habitat, where livestock grazing would be excluded (See Table 1-8).

On the remaining 242,966 acres of public land including 34 acres of riparian vegetation (Figure 2-4), utilization would be moderate on native ranges (up to 60 percent) and heavy (80 percent) on crested wheatgrass seedings. These levels of utilization are presently occurring on deferred rotation systems covering 85,360 acres. All of this area has either a static or upward trend. As a result, this system and level of utilization is expected to either maintain or increase the composition of desirable species.

The deferred rotation system would result in most desirable species being grazed during the critical part of the growing season 1 out of 2 or 3 years. However, some woody species such as bitterbrush, would be grazed every year during their critical growing period.

Grazing use during the critical growing period would be alternated with grazing during early spring or late summer/fall in successive years. The early spring grazing would end early enough to give most desirable species an opportunity to replenish food reserves and maintain good vigor. The late summer grazing would occur after food reserves of most plants had been stored and therefore would not damage the desirable species.

The deferred rotation system also would enhance reproduction slightly except on concentration areas, which include the 34 acres of riparian vegetation. No increase of desirable species is expected on concentration areas. Although the spring grazing would uproot some of newly germinated plants, it is expected that seedlings in most areas would not be significantly disturbed by spring grazing. These plants would then have 1 or 2 years for establishment before the spring grazing occurred again.

On the 16 acres of riparian vegetation where utilization would be restricted to 50 percent of riparian species, this system would enhance both reproduction and vigor of the desirable herbaceous species. Deferred grazing at a moderate use level would give riparian species a chance to store root reserves and reproduce in the same manner as described above for the other areas. Utilization of the remaining 1,824 acres included in restrictive use would be light.

On the 489 acres (includes 28 acres of riparian vegetation) where livestock grazing would be excluded, the composition of the desirable species is expected to increase significantly.

Conclusion

The deferred rotation system would cause a slow increase in composition of the desirable herbaceous vegetation and no change in composition of desirable woody species on 242,966 acres (includes 34 acres of riparian vegetation).

Where utilization is restricted on non-riparian areas (1,824 acres) composition of both herbaceous and woody species would increase. Herbaceous species would increase on the 16 acres of riparian acres where utilization is restricted, but woody species would not. On the 489 acres (including 28 acres of riparian vegetation) subject to livestock exclusion, composition of all desirable species would increase.

Rest Rotation System

Rest rotation grazing would occur on 145,876 acres of public land including 390 acres of riparian vegetation. Heavy levels of utilization are proposed for 134,562 acres. Utilization of native desirable species would be limited to 70 percent of annual production and crested wheatgrass would be limited to 80 percent of annual production.

Livestock grazing use would be restricted to 50 percent utilization of the riparian species on an additional 11,266 acres (includes 320 acres of riparian vegetation) of public land. (See Table 1-4.) All livestock grazing would be excluded from 48 acres (including 16 acres of riparian vegetation) of public lands. (See Table 1-8.)

Where utilization would be up to 70 percent of annual production, the rest rotation system would result in the desirable species being grazed during the critical part of the growing season once every 2 or 3 years depending upon which variation of the system is used.

The two-pasture rest rotation system is not expected to result in rapid changes in vigor of either early or late maturing plants because the benefit of a full growing season's rest is largely offset by a full growing season of grazing. This system would not be conducive to seedling survival because many young plants that may become established during the rest year would be subject to uprooting and season-long grazing the following year.

Consequently, the two-pasture variation would produce a slow increase in percent composition of desirable species. The three-pasture system would improve the vigor of most desirable species because grazing during the growing season is preceded by two growing seasons of rest.

Reproduction of most of the desirable species would be enhanced by the three-pasture rest rotation system because it allows up to 2 full years for seedling establishment before seedlings are subjected to spring grazing. Conditions for reproduction of late maturing desirable plants would not be as ideal because the 2 years of grazing during their growing period would reduce vigor and seed production. Once seeds have germinated, however, both late and early maturing plants would have approximately the same opportunity for establishment.

Of the 110,000 acres where the proposed rest rotation and utilization levels would remain unchanged 63,307 acres are in good range condition and an additional 28,904 acres have an upward trend. Based on these results, this system

is expected to increase the composition of the desirable species on the 134,562 acres where heavy utilization of the desirable native species and crested wheatgrass would be allowed.

On the 11,266 acres where utilization would be restricted, similar results would be expected, although composition of desirable riparian species would increase more rapidly than the area receiving heavy use.

On the 48 acres where livestock grazing would be excluded (includes 16 acres of riparian vegetation) composition of all the desirable species would increase as described under Deferred Grazing System.

Conclusion

Both the two- and three-pasture variations of the rest rotation system would increase the composition of desirables on the 134,562 acres where heavy utilization (up to 70 percent of desirable native species) is proposed and the 11,266 acres where moderate utilization (up to 50 percent of riparian species) is proposed. A similar but more rapid increase of desirable species composition is expected on the 48 acres where livestock use is excluded.

Early Grazing System

The early grazing system would occur on 25,728 acres of public lands including 8 acres of riparian vegetation (Figure 2-4). This grazing system would result in the desirable species being grazed each year for a short period during the early portion of their growing season. Because livestock diets at this time are virtually all grass, grasses would be the only plants impacted directly by this grazing system (Vavra and Sneva 1978).

Utilization of desirable species would be limited to 80 percent of the forage available during April. Because grazing occurs before full growth, it is estimated that 80 percent utilization during this period removes approximately 20-30 percent of the total yearly vegetation production.

Grazing during this period (April) requires plants to draw heavily upon food reserves to replace the grazed portions. However, grazing ceases while adequate soil moisture is still available for the grazed plants to reach full growth, produce seed and fully replenish food reserves. Consequently, this form of grazing promotes the vigor of perennial grasses (Stoddart, Smith, and Box 1975, p.133; Cook 1971). This system would enhance the production of perennial grasses since production of a large number of viable seed is dependent upon vigorous mature plants (Hanson and Stoddart 1940). Seedling establishment would depend upon the intensity of grazing in the spring following germination. If seedling plants are not physically damaged through trampling or being pulled up, they would normally be firmly established by the start of the third growing season (Stoddart, Smith, and Box 1975, p. 483).

Conclusion

The early grazing system would increase the percent composition of the desirable species on 25,728 acres of public land.

3.1.2.3 Range Improvements

Construction of range improvements (except seeding) would cause a localized, short-term removal of vegetation on 399 acres. After revegetation, 127 of these acres would remain bare of all vegetative cover (Table 3-2).

Table 3-2

Land Disturbance from Proposed Range Improvements

Range Improvements	Units	Acres Temporarily Disturbed	Acres Permanently Disturbed
Reservoirs	230 each	230	115
Wells	4 each	1	0
Springs	109 each	27	10
Pipelines	53 miles	106	2
Fences	70.7 miles	35	0
Cattle guards	24 each	(included in fences)	
Seeding	32,782 acres	32,782	0
		33,181	127

In addition, new water developments would cause an unquantified loss of riparian vegetation. As springs are developed, water previously supporting small areas (0.1 acre per spring) of riparian vegetation would be diverted to livestock water troughs. In some cases, this loss of water would cause the riparian vegetation to die. If each proposed spring development was affected in this manner, approximately 25 acres of riparian vegetation would be lost. Some of this vegetation loss would be offset by the proposed fencing of the source and overflow areas around the springs to be developed. Fencing would protect any remaining riparian vegetation at spring sources and would allow growth of new riparian vegetation on the overflow areas.

The construction of water developments would have a localized impact on the vegetation around each development. Cattle tend to congregate around water, eating all the available forage in the immediate vicinity. The development of new water sources would also allow livestock to use an unquantified amount of previously unavailable forage and thus would reduce grazing pressure on areas near existing water sources. The new water areas would lead to more uniform livestock grazing use and result in fewer heavily grazed acres.

New fences could cause cattle to trail along the fence as they seek a route to their former range. However, vegetation would reestablish in these trails as the livestock became more accustomed to their new limited range. As a result fences would not cause a significant change in composition of the desirable species.

A total of 32,782 acres are proposed for seeding with crested wheatgrass and yellow sweetclover. (See Table 1-6 and Figure 1-1.) Two-thirds of this area (21,923 acres) is either almost devoid of all vegetation or dominated by annual grasses and forbs. The remaining 10,859 acres are dominated by a dense stand of big sagebrush containing few herbaceous understory plants. Seeding is not proposed on any existing diverse plant communities.

In the Drewsey area, fall seedings using a rangeland drill have been the most successful. Normally, such seedings have resulted in stands of crested wheatgrass with minimal reinvasion of sagebrush during the first 10 years. Similar success is expected on the 32,782 acres proposed for seeding, since seedings would occur in the fall and rangeland drills would be used.

Since only desirable species are being planted, seeding is expected to increase composition of the desirable species on 32,782 acres.

Sagebrush would be removed on 10,859 acres to prepare the site for seeding with crested wheatgrass and yellow sweetclover. This removal would be accomplished by spraying 2,4-D herbicide or mechanical shredding. (Refer to Table 1-6 and Figure 1-1.)

The herbicide 2,4-D is normally sprayed during the rapid growth stage of sagebrush (May 10-June 10) and would be expected to remove all susceptible broadleaved woody and herbaceous plants in the same growth stage. However, not all broadleaved species are equally susceptible and not all would be in the most susceptible stage at the same time. Therefore, it is difficult to determine which species would be killed by application of 2,4-D until just prior to spraying. In addition, the areas proposed for herbicide application are dominated by big sagebrush and have very few understory species. Table 3-3 is a list of broadleaved plants found on the project areas which may be killed. Most of the annual herbaceous species would normally reappear the following year because these species are quite common and an adequate seed source is available on adjacent areas.

All project areas would be intensively inventoried for the presence of threatened and endangered plants. Since no spraying would be allowed where threatened and endangered plants have been identified, no impact to these species is expected.

A minimum 100 foot buffer strip would be left around the 1 mile of riparian vegetation in Allotment 5529. As a result, no impacts to riparian vegetation are expected.

Table 3-3

Plants Impacted by 2,4-D

Big sagebrush	Artemisia tridentata	Fiddleneck	Amsinkia spp.
Buckwheat	Eriogonum spp.	China lettuce	Lactuca spp.
Aster	Aster spp.	Storksbill	Erodium cicutarium
Phlox	Phlox spp.	Biscuitroot	Lomatium spp.
Onion	Allium spp.	Penstemon	Penstemon spp.
Peppergrass	Lepidium perfoliatum	Larkspur	Delphinium spp.
Lupine	Lupinus spp.	Tumblemustard	Sisymbrium altissimum

BLM and State of Oregon standards for application of herbicides would be followed to minimize impacts outside of the target areas. However, in a worst case situation, vegetation in adjacent non-target areas could be killed or damaged.

Based upon past brush control projects, approximately 90 percent of the sagebrush would be eliminated. Grasses, except when seedlings, are not susceptible to 2,4-D (Heady 1975). Sagebrush control would leave more soil moisture for the remaining grasses and the species to be seeded. Since no grazing would be allowed for 2 years folowing spraying to allow for establishment of the seeding, the plants not killed would greatly improve in vigor and reproduce.

Eradication of sagebrush through beating would normally take place in summer. Since the beaters employed in this treatment would not touch the soil, most plants less than 6 inches tall, including sagebrush, would survive the treatment. Most herbaceous vegetation would be mature and therefore not impacted significantly.

Plants not damaged by this treatment would receive impacts similar to those plants remaining following 2,4-D application. Both of these treatments would be completed during the same grazing season as the proposed seedings. Consequently, live plants would be reestablished during the following year. It is expected that reestablishment of the woody species to their previous composition would be quite slow.

Overall, brush control would eliminate most of the sagebrush on 10,859 acres. No change in composition of threatened and endangered plants or riparian vegetation would be caused by the proposed brush control.

3.1.2.4 Summary of Impacts to Vegetation Composition

The previous analysis indicates how each component would impact the composition of the desirable species. As indicated earlier (Section 3.1.1), any

change in composition of desirable species (Table 3-1) would ultimately lead to an opposite change in composition of undesirable plants.

Each allotment would be impacted differently because each allotment would receive a different combination of the three components of the proposed action. The expected changes in composition of desirable species in each allotment are shown on Table 3-5.

The following example, using the Coal Mine Allotment 5514, shows how the previous analysis was used to arrive at the anticipated changes in composition.

The proposed action for this allotment includes the following components:

1. Reduce livestock grazing use 43 percent from 412 AUMs to 236 AUMs. The average grazing rate would then be 19.4 acres per AUM (ac/AUM).

2. Implement a deferred rotation grazing system. This allotment is now being grazed with a continuous use system.

3. Seed 1,000 acres with crested wheatgrass and yellow sweetclover.

4. Construct eight reservoirs and develop six springs.

It is assumed that the deferred rotation system would work as well on this allotment as it has on six nearby allotments which now have a deferred rotation system. The 22,272 acres of sagebrush community on the six nearby allotments are in fair condition, are grazed at an average rate of 9.97 ac/AUM, and have an average species composition of desirable species of 15.7 percent.

The big sagebrush community in the Coal Mine Allotment consists of 3,596 acres, is in poor range condition and is grazed at an average rate of 19.4 ac/AUM. The remaining 981 acres are dominated by stiff sagebrush, are in good condition, and are not expected to improve significantly.

The proposed action would increase the composition of desirable species on 1,000 acres within the Coal Mine Allotment by seeding crested wheatgrass and yellow sweetclover. Based on adjacent seedings in fair condition, and assuming the proposed seeding is successful, desirable species should comprise approximately 50 percent of the vegetative composition. A similar change in composition is expected on the 32,782 acres where seeding is proposed.

Initiating a deferred rotation system, reducing livestock use and developing additional water are proposed for the remaining 2,596 acres of the big sagebrush community which is in poor condition. Based upon the proposed moderate level of use and the expected improvement of vigor and reproduction discussed in Deferred Rotation System, the compositon of desirable species is expected

to increase from the existing 8.2 percent to 15.7 percent, the same percent composition as on the nearby allotments with deferred rotation systems. No significant decrease of woody undesirable species is expected. A similar response in composition is expected on the 245,329 acres where deferred rotation is proposed.

Overall, the proposed action (grazing reduction, deferred rotation system, seeding, and water development) would increase the average composition of desirable species in the Coal Mine Allotments's big sagebrush area from 8.2 percent to 24.5 percent.

The expected changes in composition of the desirable species outlined in Table 3-5 are expected to occur based upon an analysis of past changes on allotments having similar environmental conditions (grazing use, vegetation communities, soils, grazing systems and range developments). Equivalent responses in composition are expected on allotments having similar proposals. These changes in composition are the basis for the expected changes in range condition, forage production and ground cover (shown in Table 3-5) discussed in the following sections.

3.1.3 Impacts to Condition and Trend

The proposed action (forage allocation, grazing systems, and range improvements), by increasing the composition of desirable species, would produce an improved range condition and upward range trend. The magnitude of change in range condition projected for each allotment is based upon the present range condition, the forage allocation, the present and proposed grazing system, the amount and type of proposed range improvement, and the results of similar actions on other areas within the Burns District.

In most cases, this change would occur during the first two or three cycles of the proposed grazing systems. The number of acres in good range condition would increase by 117,321 acres, with corresponding decreases of acres in fair and poor condition of 98,221 acres and 19,100 acres, respectively. In addition, there would also be an increase in the amount of desirable species on the remaining acres. However, these acres would not improve enough within 10 years after full implementation to fall within the good condition classification.

The anticipated change in range condition resulting from grazing systems would be further benefited by the range improvements. The proposed seedings would improve range condition from fair or poor to good on approximately 20,924 acres due to the increase in vegetative cover and the substitution of crested wheatgrass and yellow sweetclover for undesirable species. These seedings would account for approximately 18 percent of the increase of acres in good condition.

The following example, using the previously discussed changes of desirable species composition in the Coal Mine Allotment 5514, explains the methodology for predicting the future range condition shown on Table 3-5.

As shown in Section 3.1.2 (Summary of Impacts to Vegetation Composition), 981 acres within the Coal Mine Allotment are in good range condition. No change in composition is expected; consequently, this area would remain in good condition. Crested wheatgrass would be seeded on 1,000 acres which are presently in poor condition. The composition on this area is expected to be at least 50 percent desirable plants. Based upon the methodology shown in Appendix B5 (Range Condition and Trend), the seeding, when established, would improve the range condition from poor to good condition. The composition of desirable species on the remaining 2,596 acres would increase from 8.2 percent to 15.7 percent and would change the range condition rating from poor to fair.

The net result of this change would improve the overall range condition in the Coal Mine as follows:

Present Range Condition			Future Range Condition		
Acres Good	Acres Fair	Acres Poor	Acres Good	Acres Fair	Acres Poor
981	-	3,596	1,981	2,596	-

3.1.4 Impacts to Forage Production

The proposed action is expected to increase forage production on the intensive management areas from 76,987 AUMs to 99,617 AUMs. This increase is based upon the expected increase in the amount of desirable plants and the accompanying decrease of undesirable plants which would result from the combined effect of the forage allocation, grazing systems, and range improvement.

Both the initial and projected forage carrying capacities (total available AUMs, as listed in Table 1-2) were determined using the technique outlined in Appendix B5.

Again, using the Coal Mine Allotment 5614, the following example shows how changes in composition of desirable species cause an increase in forage production.

Based upon present livestock grazing use of similar seedings under a deferred rotation system, it is expected that the 1,000 acre seeding could be grazed at a rate of 5.0 acres per AUM. A similar comparison indicates native ranges in fair condition to upward trend can be grazed at an average rate of 12.0 ac/AUM and ranges in good condition at a rate of 7.0 ac/AUM.

Using these rates, the 1,000-acre seeding would produce 200 AUMs of forage. The 2,596 acres expected to improve to fair condition would produce 216 AUMs and the remaining 981 acres of native range in good condition would produce 140 AUMs. The combined effect of the livestock reduction and grazing system (356 AUMs), the seeding (200 AUMs), and the development of new water sources (10 AUMs) would increase the forage production rate from 15.6 ac/AUM to 81 ac/AUM and produce the projected forage production (566 AUMs) shown on Table 1-2.

The proposed forage carrying capacities were compared to the forage production as determined by Pomerening et al. (1974) to see if the initial and projected forage allocations are within the productive capacity of the soils in the ES area as shown in Table 2-5. Selected allotments in good or fair range condition that were entirely within a soil division (shown on Figure 2-2, General Soils--volcanic, lacustrine, or upland volcanic) were used for this comparison. Table 3-4 shows the results of this analysis.

Table 3-4

Forage Production

Soil Divisions	Range of Existing Forage Production (lbs/ac)1/	Initial Allocation (lbs/ac)2/	Projected Allocation (lbs/ac)2/
Volcanic	50-350	75	86
Lacustrine	175-800	86	113
Upland volcanic	25-700	90	111

1/ From Table 2-5. The range displays the lowest production in lbs/acre on areas in fair condition to the highest production for areas in good condition.

2/ Initial and projected AUMs from Table 1-2 for the selected allotments were converted to pounds of forage per acre on the basis of 800 pounds/AUM.

The analysis shows that both the initial and projected forage allocation are on the low end of the range of forage production on Table 3-4, therefore, the allocations would be well within the soil's productive capacity.

3.1.5 Impacts to Vegetative Ground Cover

The estimates of changes in ground cover shown on Table 3-5, Summary of Impacts to Vegetation, are based upon the relationship among the existing ground cover and range condition, the proposed utilization of the desirable species and the projected increase in composition of desirable plants.

An analysis of the 1976 Phase I Watershed Conservation Inventory data indicates that there is virtually no difference in ground cover between areas in good and fair range condition. The percent of ground covered by vegetation and litter within the two major vegetation communities in the Drewsey ES area was calculated. Considering the proportion of the ground covered by each inventory transect, it was determined that the ground cover in the big sagebrush community was 50.3 percent in the good condition areas and 51.8 percent on the fair condition areas. Within the low sagebrush community, ground cover of the good condition area was 46.9 percent and on the fair condition areas it was 45.2 percent. Therefore, it has been concluded that, with the exception of the seedings, no change in total ground cover would occur as range condition improves.

The vegetative ground cover in seeded areas would increase in the long term because approximately 4,100 acres which now have a very sparse vegetative cover would be replaced by a more dense stand of perennial vegetation (crested wheatgrass and yellow sweetclover). In the short term, the vegetative ground cover of the sprayed area (10,859 acres) would be reduced for 1 year until the seeded species grow and the native herbaceous species become reestablished.

Although the total vegetative ground cover as explained above would not increase except in the seeded areas, the proposed lower level of utilization would, in the long term, increase the amount of vegetation remaining as ground cover after livestock grazing is completed (residual ground cover). In the short term, there would be a reduction in vegetative ground cover in the allotments receiving increased livestock grazing. (See Table 1-2.)

In addition, based upon the expected increase in composition of desirable plants, perennials would make up a larger portion of the vegetative ground cover than at present. The yearly production of perennials varies less than the production of annuals in response to changing climatic conditions. Also, much of the above ground parts of both woody and herbaceous perennial species remain standing until spring growth recurs. Annuals, on the other hand, produce less ground cover in adverse growth years and, because they are not as structurally strong, often blow or break down during fall and winter. As a result, perennials provide more persistent ground cover than annuals.

The following example, using the Coal Mine Allotment 5514, displays the technique used to predict the changes in ground cover shown on Table 3-5.

In the previous examples it was indicated that the 1,000 acres of the area in poor range condition would be seeded. The existing vegetative ground cover of this area is 24.8 percent. Good condition seedings in the area have an average of 39.4 percent vegetation ground; consequently, the vegetative ground cover of the seeding area should increase from 24.8 percent to 39.4 percent.

On the remaining 3,577 acres, no change in composition is expected on one-third of the area (981 acres) which is in good condition. The other two-thirds (2,596 acres) is now in poor condition and a significant increase in

Table 3-5

Summary of Impacts to Vegetation

Allotment Name & No.	Composition[1/] Desirable Grasses	Composition[1/] Desirable Shrubs	Range Condition Good (acres) Present	Good (acres) Future[1/]	Fair (acres) Present	Fair (acres) Future[1/]	Poor (acres) Present	Poor (acres) Future[1/]	Forage Production Present AUMs	Forage Production Projected AUMs	Vegetative Ground Cover Short Term	Vegetative Ground Cover Long Term
5101 Devine Ridge	+3	+2	5,836	6,833	2,550	1,550			809	1,225	+3	+5
†5102 Prather Creek	+1	+1	825	825	200	200			49	62	+1	+2
5103 Lime Kiln	+1	0		594	3,314	2,720			227	294	0	+1
5104 Soldier Creek	+3	+2	2,588	2,588					105	107	0	+2
5105 Camp Harney	+3	0	5,371	5,371	8,763	8,763			893	1,572	0	+3
5106 Cow Creek	+2	0			2,977	2,977			234	413	+3	+4
5108 Little Cow Creek	+2	+1		806	2,777	1,971			468	550	+2	+3
5201 Coleman Creek	+3	+1	2,504	2,504					500	601	0	+3
5202 Hunter	+2	+1	2,778	2,778					477	477	+4	+4
5203 Catterson	+2	+1		200	640	440			73	99	+2	+2
5204 Slocum Field	+2	+1			1,917	1,917			314	314	0	+1
5205 Venator	+3	+1		200	2,861	2,661			325	362	0	+2
5207 Coyote Creek	+1	+1		1,098	1,098				110	139	0	+1
5208 Emmerson	+2	+1			1,860	1,860			260	260	0	+2
5209 Crane	+1	+1	1,935	1,935					350	400	0	+2
5210 Windy Point	+1	0	2/						53	63	0	+1
†5211 Beckly Home	+1	+1			1,494	1,494			113	189	0	+1
5212 Mahan Ranch	+2	0		400	4,577	4,177			339	438	0	+2
5213 Beaver Creek	+3	+1	6,332	8,337	2,240	235			906	1,412	+1	+2
5214 Hamilton	+1	0	2/						306	306	0	0
5215 Davies	+1	0			3,442	3,442			279	279	0	0
5217 Thompson FFR 3/	+1	0	2/						3	3	0	0
†5301 Princeton	+2	+1	18,376	18,376					1,922	3,874	0	+2
5302 Big Bird	+2	0	2,566	2,566					513	513	0	+2
5303 Dry Lake	+4	+1	26,479	30,279	4,800	3,870	3,370	500	3,500	7,398	-2	+3
5304 Square Butte	+3	+1	5,001	5,001					833	986	-2	+2
†5305 Crow's Nest	+2	0	2,921	2,921					500	1,000	0	+1
5306 Rocky Ford	+2	0	4,457	4,457					1,114	1,114	0	+1
5307 Smyth Creek	+3	0	12,985	15,225	16,297	14,057			3,711	4,627	0	+2
5308 East Kiger	-1	-1			8,720	8,720			918	918	0	-1
5309 Happy Valley	+2	0		1,466	3,844	2,378			530	573	0	+2
5310 Riddle Mountain	+3	+1	7,468	15,545	12,720	4,643			3,096	3,387	0	+2
5311 Government Field	+3	0	1,339	1,339					152	152	0	+2
5312 Deep Creek	+3	0	2/						208	208	0	+2
†5313 Burnt Flat	-1	0	10,720	12,251	27,564	26,033			5,195	5,505	0	+1
†5314 Summit Springs	-1	-1	10,873	10,873					1,407	1,857	0	-2
5315 S. Fk. Malheur	+4	+2	18,019	36,039	19,521	1,501			5,597	5,863	0	+3
5316 Virginia Valley	+2	+1	9,599	13,005	4,068	3,265	2,603		3,666	4,375	-1	+1
5321 Hamilton Indiv.	+2	0	2/						143	143	0	+1
5324 West Kiger	+1	0	2/						230	230	0	+1
5501 E.Fk. Cow Creek	+1	+2		1,219	2,510	1,291			270	362	0	+1
5502 Rock Creek	+2	+1	3,720	4,000	280				531	687	-1	+1
5503 Pine Creek	+1	+1	12,057	17,606	6,829	2,560	1,280		2,450	2,450	+1	+2
5505 Little Muddy	+1	-1	2,609	6,282	4,933	1,260			818	1,183	+2	+2
5506 Muddy	+2	-1	825	825	3,303	3,303			427	577	+1	+2
5507 Wolf Creek	-1	-1	870	870					136	136	0	-1

Table 3-5 (Continued)

Summary of Impacts to Vegetation

Allotment Name & No.	Composition1/ Desirable Grasses	Desirable Shrubs	Good (acres) Present	Future1/	Range Condition Fair (acres) Present	Future1/	Poor (acres) Present	Future1/	Forage Production Present AUMs	Projected AUMs	Vegetative Ground Cover Short Term	Long Term
5508 Baker Knowles	+4	+4	845	845					42	70	0	+4
5509 William Dripp Spr.	+4	+4	545	865	800	480			95	166	+2	+4
5510 Jones Dripp Spr.	-1	-1		762	762				125	124	0	-2
5511 Moffet Table	+4	+1	10,170	13,633	5,042	1,579			1,908	2,314	+1	+3
5512 Clark's River	-1	-1			487	487			45	45	0	-1
5513 Shelly & FFR	+4	+2		480	4,949	4,469			332	614	+1	+3
5514 Coal Mine Creek	+5	+1	981	1,981		2,596	3,596		293	566	+2	+5
5515 Mule Creek	+3	+2	2,713	4,340	2,711	1,084			323	575	+2	+3
5516 Birch Creek	+3	0	1,340	1,340					280	280	0	+2
5517 Otis Mountain	+3	+1	8,445	8,445		4,546	4,546		1,767	1,887	0	+2
5518 Newell Field	+1	+1			990	990			165	165	0	+1
5520 Little Upson	-1	-1	2/						24	24	0	-1
5521 Rocky Basin	+4	+1		3,060	3,775	715			330	696	+2	+4
5522 Cottonwood	+1	0		3,582	8,397	4,815			850	1,011	+2	+3
†5523 Hart	+1	+1		1,277	1,277				260	305	+1	+2
5524 Tub Springs	+2	0	698	3,169	2,471				466	566	+2	+3
5525 Mill Gulch	+3	+1		2,264	2,264				300	453	+2	+4
5526 Chalk Hills	+3	+1	6,231	8,941	2,710				1,155	1,336	+2	+3
5527 Drinkwater Summit	+3	+1	1,349	1,349	1,440	1,440			241	311	+2	+4
5528 Cooler	+3	0		4,568	3,408	480	1,640		475	816	+2	+3
5529 House Butte	+4	+1	1,193	8,297	22,833	17,807	2,078		2,449	3,896	+2	+4
5530 River	+5	+1	34,463	39,802	14,076	8,737			1,755	1,902	+2	+4
5531 Stinkingwater	+3	+1	13,417	23,461	10,044				3,160	4,160	+2	+3
†5532 Mountain	+1	0	11,974	16,421	22,237	17,790			3,674	4,558	0	+1
5533 Buchanan	+1	0	2,095	2,095	233	233			263	263	0	+2
5534 Mahan Creek	+2	+1	2/						286	379	0	+2
5535 Miller Canyon	+3	+1		5,592	6,572	980			330	633	+4	+5
5536 Alder Creek	+3	+1	23,862	23,862	5,517	5,517			2,428	3,102	+2	+3
5537 Buck Mountain	+3	+1	8,095	8,831	6,624	5,888			1,921	2,610	0	+2
5538 Riverside	+4	+2	7,379	11,920	6,812	2,271			2,096	2,734	+3	+4
5541 Wilber FFR	+1	0	2/						105	109	0	0
5544 Brooks Field	0	0	2/						68	68	-2	-2
5564 Wheeler Basin	+3	+3	4/						584	633	+2	+3
5565 Upton Mountain	+1	+1	4/						1,506	1,633	+1	+2
5566 Texaco Basin	+3	0	4/						1,829	2,933	+2	+3
Total acreage			314,848	435,799	292,530	190,192	19,113	500	76,987	99,617		

† See Appendix G for discussion of these impacts.
1/ Anticipated long-term impacts
2/ No range condition information available
3/ Impacts shown with Mahan Ranch Allotment 5212
4/ Range condition data shown with River Allotment 5530

Note: Where insufficient data prevented quantification, anticipated changes are expressed using a range of numbers. Present conditions are represented by a zero; an improvment or increase is shown by a positive number between 1 and 5 and a deterioration or decrease is shown by a negative number between -1 and -5. A large number either positive or negative indicates a larger change from the present than a small number.

composition of desirable species is expected in the long term (Section 3.1.2 Impacts to Vegetation Composition). This increase is expected to cause an unquantified increase in persistent ground cover (vegetative cover produced by perennial plants) than at present on the 2,596 acres.

In addition, livestock use would be reduced by 43 percent. By allowing less grazing use, more of the existing vegetation would remain at the end of the grazing period as residual ground cover.

All of these actions combined would cause an unquantified increase of vegetative ground cover in the Coal Mine Allotment 5514 as shown on Table 3-5 (Summary of Impacts to Vegetation). Equivalent responses in ground cover are expected on allotments having similar proposals.

No significant changes in wildfire occurrence would be caused by the proposed action. Although more vegetation would remain after grazing, more of the total vegetation would be perennial species and less would be sagebrush and annual plants. Perennials remain green longer than annuals and are not as susceptible to fire as sagebrush overstory/annual understory areas. An analysis of fire occurrence records from an ajacent district covering a period before and after livestock reductions indicated that climate conditions and other factors such as access, type of fire fighting equipment and human activities were the primary factors in the number and size of wild fires.

3.1.6 Impacts to Threatened and Endangered Plants

Little specific data are available on the 49 plant species listed or proposed for listing on Federal or State lists as threatened or endangered (Table 2-7). Consequently, no specific impacts are identified. However, potential impacts of changed livestock grazing patterns caused by installation of range developments could lead to additional trampling and grazing damage. These adverse impacts would be partially mitigated by the reduction of livestock grazing and requiring an intensive T&E plant inventory during project planning to identify species and prevent deterioration of T&E species habitat (see Chapter 1, Section 1.2.2.2).

3.1.7 Conclusion to Impacts on Vegetation

Overall, the three components of the proposed action would increase the composition of the desirable species in most vegetation communities in the long term. The composition of desirable species would increase on approximately 540 acres of the riparian community, remain unchanged on 115 acres and be reduced on the remaining 70 acres of riparian vegetation. Composition of the desirable species would increase on 97 percent of the remaining area (617,740 acres) and would decrease on 3 percent (18,000 acres). Increases in desirable species would cause a reduction in undesirable herbaceous plants.

Range improvements would cause a temporary reduction of vegetation on 33,181 acres and permanent loss of vegetation on 127 acres (see Table 3-2). However, there would be a net increase in vegetated acres due to the 4,000 acres of seeding on essentially bare areas.

The overall increase in desirable species would improve range condition on 19 percent of the ES area from fair to good. Forage production would increase from 79,167 AUMs to 101,773 AUMs. Although total ground cover would not increase except on seedings, both persistent and residual ground cover would increase an unquantifiable amount. No specific impacts to threatened and endangered plant species were identified.

3.2 IMPACTS ON SOILS

3.2.1 Forage Allocation and Grazing Systems

The proposed forage allocation and grazing systems would improve the soils of the ES area by increasing ground cover (vegetation and litter accumulation). With the decrease in the amount of the livestock forage (8,442 AUMs) consumed by cattle in the proposed action, more vegetation and litter would be left at the end of each grazing season. In the long term, the amount of desirable perennial grasses would increase and undesirable annuals would decrease (see Section 3.1 Vegetation for discussion). Perennial grasses have a larger root system to hold soil in place, and they provide, on the average, more persistent ground cover than annuals. Bailey and Copeland (1961 Cited by Mattison et al. 1977) found that as vegetation and litter cover increased, overland flow of water and erosion decreased. This protective cover would reduce soil movement, reduce raindrop impact, and decrease compaction, thus increasing the infiltration rate of water into the soil. Soil erosion would therefore lessen with the proposed action. The expected changes in erosion condition classes 10 years after full AMP implementation are shown in Table 3-6.

Table 3-6

Comparison of Erosion Condition Classes

Condition Class	Present Condition (acres)	Percent	Future Condition (acres)	Percent	Change in Condition (acres)	Change in Condition (percent)
Stable	197,154	31.5	494,830	79.0	+297,676	+47.5
Slight	373,069	59.5	129,135	20.6	-243,934	-38.9
Moderate	49,105	7.8	2,526	.4	- 46,579	- 7.4
Critical	5,488	.9	0	0	- 5,488	- .9
Severe	1,675	.3	0	0	- 1,675	- .3
	626,491	100.0	626,491	100.0		

Source: USDI, BLM 1976.

Table 3-7 shows erosion condition classes by allotment. See Appendix B2 for methodology used to determine future erosion condition.

Erosion would continue to be greater on the 487,000 acres of sedimentary soils than on the 857,000 acres of volcanic soils although the total amount of erosion would be reduced. Of the 17 allotments with highly erodible lacustrine soils (Figure 2-2), 14 allotments have an initial allocation made for watershed. This allocation ranges from 5 to 500 AUMs, with an average allocation of 218 AUMs. The vegetation left on the ground from this allocation would help protect the soil from erosion.

Approximately 32 miles of streambanks would continue to erode at present rates on allotments with deferred, continuous, deferred rotation, and rotation grazing systems. On allotments with early use and rest rotation grazing systems, streambank erosion would decrease. These two grazing systems would give riparian vegetation, especially woody vegetation, a chance to reestablish itself and help stabilize streambanks (see Table 1-3). For example, a rest rotation grazing system has been in effect along Rattlesnake Creek in Allotment 5105 since 1975. Observation indicates that riparian vegetation along the creek has increased, with aspen and willows becoming established. Exclusion of livestock from 10.7 miles of perennial streams (see Table 1-8) would greatly reduce streambank erosion. Riparian vegetation would rapidly increase along the fenced miles and help stabilize the streambanks. Along the 11.2 miles of perennial streams proposed for restrictive use, riparian vegetation would also increase, although not as rapidly as with total exclusion of livestock, and streambanks would begin to stabilize.

Table 3-9 also gives some information on expected streambank condition as related to fish habitat (Section 3.4 Impacts on Wildlife).

There would be little or no change in gully erosion on large gullies due to the proposed action, since erosion on most large gullies cannot be checked without control structures. Small gullies would stabilize due to the increase in persistent ground cover.

The exclusion of livestock by fencing 1,523 acres in Allotment 5530 (Drinkwater Basin area) and Allotment 5514 Coal Mine Creek (see Table 1-8 for location) would lead to an increase in ground cover and protect the soil from erosion. However, exclusion of livestock will not heal the large gullies in these two areas.

The initial and projected forage allocations are within the productive capacity of the soils in the area, as shown on Table 3-4 Forage Production.

3.2.2 Range Improvements

The construction of all range improvements would temporarily disturb 33,181 acres (Table 3-2), subjecting those acres to wind and water erosion, for a

Table 3-7

Erosion Condition Classes

Allotment Name and Number	Stable (acres)		Slight (acres)		Moderate (acres)		Critical & Severe (acres) 3/	
	Present	Future	Present	Future	Present	Future	Present	Future
5101 Devine Ridge	1,216	8,386	7,170	-	-	-	-	-
5102 Prather Creek	-	-	1,025	1,025	-	-	-	-
5103 Lime Kiln	1,744	3,314	1,570	-	-	-	-	-
5104 Soldier Creek	-	1,038	2,588	1,550	-	-	-	-
5105 Camp Harney	-	2,120	12,014	12,014	2,120	-	-	-
5106 Cow Creek	-	-	1,697	2,977	1,280	-	-	-
5108 Little Cow Creek	-	2,555	2,777	222	-	-	-	-
5201 Coleman Creek	-	2,504	2,504	-	-	-	-	-
5202 Hunter	-	2,778	2,778	-	-	-	-	-
5203 Catterson	-	640	640	-	-	-	-	-
5204 Slocum Field	-	1,917	1,917	-	-	-	-	-
5205 Venator	-	1,711	1,150	1,150	1,711	-	-	-
5207 Coyote Creek	-	1,098	1,098	-	-	-	-	-
5208 Emmerson	-	1,860	1,860	-	-	-	-	-
5209 Crane	-	1,935	1,935	-	-	-	-	-
5210 Windy Point 1/	-	-	-	-	-	-	-	-
5211 Beckly Home	1,494	1,494	-	-	-	-	-	-
5212 Mahan Ranch	2,563	4,577	2,014	-	-	-	-	-
5213 Beaver Creek	-	8,572	8,572	-	-	-	-	-
5214 Hamilton 1/	-	-	-	-	-	-	-	-
5215 Davies	1,274	3,442	2,168	-	-	-	-	-
5301 Princeton	18,376	18,376	-	-	-	-	-	-
5302 Big Bird	1,231	2,566	1,335	-	-	-	-	-
5303 Dry Lake	34,649	34,649	-	-	-	-	-	-
5304 Square Butte	2,501	5,001	2,500	-	-	-	-	-
5305 Crow's Nest	2,921	2,921	-	-	-	-	-	-
5306 Rocky Ford	4,457	4,457	-	-	-	-	-	-
5307 Smyth Creek	8,825	23,362	18,057	5,920	2,400	-	-	-
5308 East Kiger	4,650	4,650	4,070	4,070	-	-	-	-
5309 Happy Valley	1,466	1,466	2,378	2,378	-	-	-	-
5310 Riddle Mountain	10,701	20,188	9,487	-	-	-	-	-
5311 Government Field	-	1,339	1,339	-	-	-	-	-
5312 Deep Creek 1/	-	-	-	-	-	-	-	-
5313 Burnt Flat	3,063	21,056	35,221	17,228	-	-	-	-
5314 Summit Springs	-	8,103	8,103	2,770	2,770	-	-	-
5315 S. Fk. Malheur	18,019	30,783	19,521	6,757	-	-	-	-
5316 Virginia Valley	10,250	16,270	6,020	-	-	-	-	-
5321 Hamilton Ind. 1/	-	-	-	-	-	-	-	-
5324 West Kiger 1/	-	-	-	-	-	-	-	-
5501 Cow Creek	-	2,510	2,510	-	-	-	-	-
5502 Rock Creek	-	4,000	4,000	-	-	-	-	-
5503 Pine Creek	1,619	17,061	15,442	1,825	1,825	1,280	1,280	-
5505 Little Muddy	1,300	3,189	2,329	4,353	3,913	-	-	-
5506 Muddy	-	4,128	4,128	-	-	-	-	-
5507 Wolf Creek	870	870	-	-	-	-	-	-
5508 Baker Knowles	-	845	845	-	-	-	-	-
5509 William Dripp Spr.	-	545	1,025	800	320	-	-	-
5510 Jones Dripp Spr.	-	762	762	-	-	-	-	-
5511 Moffet Table	2,576	15,212	12,293	-	343	-	-	-

Table 3-7 (Continued)

Allotment Name and Number	Stable (acres)		Slight (acres)		Moderate (acres)		Critical & Severe (acres) 3/	
	Present	Future	Present	Future	Present	Future	Present	Future
5512 Clark's River	-	-	-	487	-	-	487	-
5513 Shelly & FFR	148	2,573	4,801	2,376	-	-	-	-
5514 Coal Mine Creek	-	981	981	2,675	-	921	3,596	-
5515 Mule Creek	1,464	1,464	1,248	3,635	2,712	325	-	-
5516 Birch Creek	-	1,340	1,340	-	-	-	-	-
5517 Otis Mountain	8,445	12,991	4,546	-	-	-	-	-
5518 Newell Field	-	990	990	-	-	-	-	-
5520 Little Upson 1/	-	-	-	-	-	-	-	-
5521 Rocky Basin	-	3,775	915	-	2,860	-	-	-
5522 Cottonwood	-	-	4,815	8,397	3,582	-	-	-
5523 Hart	-	1,277	1,277	-	-	-	-	-
5524 Tub Springs	-	3,169	1,712	-	1,457	-	-	-
5525 Mill Gulch	-	1,260	-	1,004	2,264	-	-	-
5526 Chalk Hills	-	8,941	6,231	-	2,710	-	-	-
5527 Drinkwater Summit	-	1,349	1,349	1,440	1,440	-	-	-
5528 Cooler	-	3,408	2,085	1,640	1,803	-	1,160	-
5529 House Butte	475	13,510	14,473	12,594	10,516	-	640	-
5530 River	17,960	32,037	30,579	16,502	-	-	-	-
5531 Stinkingwater	2,807	20,108	20,654	3,353	-	-	-	-
5532 Mountain	12,658	30,790	18,474	3,421	3,079	-	-	-
5533 Buchanan	-	2,328	2,328	-	-	-	-	-
5534 Mahan Creek 1/	-	-	-	-	-	-	-	-
5535 Miller Canyon	-	-	6,572	6,572	-	-	-	-
5536 Alder Creek	6,330	29,379	23,049	-	-	-	-	-
5537 Buck Mountain	8,831	14,719	5,888	-	-	-	-	-
5538 Riverside	2,271	14,191	11,920	-	-	-	-	-
5541 Wilber FFR 1/	-	-	-	-	-	-	-	-
5564 Wheeler Basin 2/	-	-	-	-	-	-	-	-
5565 Upton Mountain 2/	-	-	-	-	-	-	-	-
5566 Texaco Basin 2/	-	-	-	-	-	-	-	-
Total	197,154	494,830	373,069	129,135	49,105	2,526	7,163	0

Total public land acres surveyed - 626,491

1/ No transects taken.
2/ Included in allotment 5530 River
3/ Only one allotment 5514 Coal Mine Creek, has any acres in Severe class (1,921 acres critical and 1,675 acres Severe).

Note: Only public land acres are tabulated and only on allotments with AMPs.

Source: USDI, BLM 1976.

minor short-term negative impact. This impact would lessen as all but 127 acres of these areas became revegetated in 1 to 3 years. Long-term impacts to soils would be negligible.

Of the 32,782 acres proposed for seeding, 21,923 acres presently lack perennial plant species of which approximately 3,900 acres are nearly completely bare of vegetation. Seeding these acres to obtain perennial vegetation would reduce soil erosion.

Livestock would concentrate around the proposed springs and reservoirs (see Figure 1-1). Approximately 3 acres around each of the proposed watering sites would be heavily grazed. Ground cover would thus decrease on a total of 1,017 acres, and erosion would increase.

3.2.3 Conclusion

The proposed action would have a localized short-term minor adverse impact on soil from exposing the soil surface to erosion due to the construction of range improvements. Erosion would decrease on the 32,782 acres to be seeded. The increase in ground cover from the proposed forage allocation and grazing systems would protect the soil surface from erosion. Gully erosion would continue at about the present rate or slightly below. Streambank erosion would decrease along 22 miles of perennial streams proposed for restrictive use or exclusion of livestock, and on 170,000 acres in allotments with early use and rest rotation grazing systems (Table 1-3).

3.3 IMPACTS ON WATER RESOURCES

3.3.1 Runoff

The expected increase in ground cover would only slightly decrease the runoff in the ES area. As plant density increases, more water infiltrates into the soil and is available to be used by plants. In this manner, less water ends up reaching streams.

3.3.2 Water Quality

Chemical constituents are not likely to change since the chemical composition depends on the source of the water and the geological substrate. Most coliform contamination from livestock comes from use in or directly adjacent to streams (Kunkle 1970 Cited by USDI, BLM [1978]). The water developments are expected to distribute livestock more evenly over the area. With fewer animals around perennial streams (Figure 2-1), coliform contamination of water from livestock would decrease. Fencing the proposed spring developments would prevent coliform contamination of the spring sources.

For the purpose of worst case analysis, it is assumed that all of the 10,859 acres proposed for brush control would be sprayed with 2,4-D. Herbicides enter streams by the following methods (USDI, BLM 1978e):

1. Leaching or subsurface flow of water.

2. Overland flow of water.

3. Direct application and drift on surface water.

The herbicide 2,4-D is quickly adsorbed on the soil, so it is not available for leaching. Afterward, it is degraded quickly by microbial activity (Norris 1967 In USDI, BLM 1978e). Also, less leaching would take place on the loamy and clayey soils in the ES area than if the soils were sandy.

The herbicide could enter streams by overland flow of water if a heavy rain occurred soon after spraying. Abrahamson and Norris (1976) found that with buffer strips along streams in Western Oregon, maximum herbicide concentrations were less than 0.01 ppm with residues detected for less than one day after herbicide application. With a buffer strip 100 feet wide on either side of perennial streams there would be a reduction in herbicide concentration in runoff water which is filtered as it moves over uncontaminated soil since soil adsorbs the chemicals.

In western Oregon, nearly all herbicides found in streams resulted from direct application of herbicides to the surface of water (USDI BLM 1978e). There is only one perennial stream within the 10,859 acres to be sprayed; the leave strip around the stream (see Section 1.2.2.2) should prevent direct application or drift on to the stream.

The proposed action would decrease the sediment yield in the area by approximately 20 percent, from 227.4 acre-feet to 179.3 acre-feet per year. Table 3-8 shows the predicted future sediment yield by allotment 10 years after full implementation (see Appendix B3 for methodology). The Middle Fork Malheur River watershed, which drains 40 percent of the ES area, presently contributes 51 percent of the total sediment yield, mostly due to the highly erodible lacustrine soils (approximately 68,000 acres) in the drainage. The proposed action would act to reduce this contribution to 46 percent of the total sediment yield. Within the Middle Fork Malheur River watershed (about 405,000 acres of public land), sediment yield would decrease by 10 percent, from 115.9 acre-feet to 104.6 acre-feet per year. The expected increase in persistent ground cover would decrease sediment yield. With the soil protected from erosion, less soil is detached and carried to the streams, resulting in an improvement in water quality.

Table 3-8

Sediment Yield

Allotment Name and Number		Weighted Average acre-feet per square mile per year Present	Future[2/]	Total Acre-feet per year Present	Future[2/]
5101	Devine Ridge	.183	.157	2.393	2.062
5102	Prather Creek	.136	.106	.218	.170
5103	Lime Kiln	.180	.139	.930	.718
5104	Soldier Creek	.159	.120	.643	.486
5105	Camp Harney	.247	.191	5.461	4.223
5106	Cow Creek	.652	.422	3.034	3.963
5108	Little Cow Creek	.274	.185	1.187	.803
5201	Coleman Creek	.163	.108	.636	.421
5202	Hunter	.230	.230	.998	.998
5203	Catterson	.130	.130	.130	.130
5204	Slocum Field	.180	.130	.539	.389
5205	Venator	.248	.166	1.107	.742
5207	Coyote Creek	.175	.130	.300	.223
5208	Emmerson	.270	.180	.785	.523
5209	Crane	.185	.136	.559	.411
5210	Windy Point[1/]	-	-	-	-
5211	Beckly Home	.105	.100	.245	.233
5212	Mahan Ranch	.175	.125	1.249	.894
5213	Beaver Creek	.184	.142	2.467	1.898
5214	Hamilton[1/]	-	-	-	-
5215	Davies	.162	.113	.872	.606
5301	Princeton	.156	.120	4.479	3.432
5302	Big Bird	.145	.130	.582	.521
5303	Dry Lake	.143	.119	7.741	6.420
5304	Square Butte	.155	.138	1.211	1.075
5305	Crow's Nest	.180	.155	.822	.707
5306	Rocky Ford	.149	.112	1.038	.778
5307	Smyth Creek	.205	.188	9.399	8.615
5308	East Kiger	.147	.147	1.999	1.999
5309	Happy Valley	.173	.142	1.037	.853
5310	Riddle Mountain	.265	.246	8.365	7.763
5311	Government Field	.270	.270	.565	.565
5312	Deep Creek[1/]	-	-	-	-
5313	Burnt Flat	.217	.198	13.009	11.829
5314	Summit Springs	.259	.229	4.400	3.888
5315	S. Fk. Malheur	.181	.175	10.621	10.242
5316	Virginia Valley	.176	.124	4.472	3.158
5321	Hamilton Individual[1/]	-	-	-	-
5324	West Kiger[1/]	-	-	-	-
5501	E.Fk.Cow Creek	.256	.166	1.004	.649
5502	Rock Creek	.218	.158	1.365	.986
5503	Pine Creek	.160	.146	5.035	4.587
5505	Little Muddy	.278	.198	3.313	2.358
5506	Muddy	.381	.243	2.457	1.567

Table 3-8 (Continued)

Allotment Name and Number		Weighted Average acre-feet per square mile per year Present	Future 2/	Total Acre-feet per year Present	Future 2/
5507	Wolf Creek	.185	.180	.251	.245
5508	Baker Knowles	.150	.140	.198	.185
5509	William Dripp Spr.	.291	.216	.611	.454
5510	Jones Dripp Spr.	.280	.195	.333	.232
5511	Moffet Table	.202	.163	4.798	3.877
5512	Clark's River	.690	.430	.525	.327
5513	Shelly & FFR	.225	.177	1.740	1.370
5514	Coal Mine Creek	.972	.582	6.950	4.162
5515	Mule Creek	.347	.246	2.941	2.086
5516	Birch Creek	.350	.270	.733	.565
5517	Otis Mountain	.168	.140	3.417	2.842
5518	Newell Field	.220	.135	.340	.209
5520	Little Upson 1/	-	-	-	-
5521	Rocky Basin	.473	.311	2.789	1.832
5522	Cottonwood	.401	.259	5.263	3.403
5523	Hart	.290	.290	.579	.579
5524	Tub Springs	.346	.266	1.711	1.316
5525	Mill Gulch	.382	.249	1.353	.881
5526	Chalk Hills	.380	.270	5.313	3.778
5527	Drinkwater Summit	.554	.349	2.414	1.522
5528	Cooler	.435	.291	3.429	2.294
5529	House Butte	.389	.276	15.879	11.248
5530	River	.337	.207	25.572	15.718
5531	Stinkingwater	.154	.133	5.638	4.858
5532	Mountain	.182	.147	9.724	7.868
5533	Buchanan	.134	.113	.487	.410
5534	Mahan Creek 1/	-	-	-	-
5535	Miller Canyon	.214	.150	2.198	1.538
5536	Alder Creek	.179	.135	8.204	6.197
5537	Buck Mountain	.162	.130	3.715	2.996
5538	Riverside	.189	.122	4.187	2.707
5541	Wilber FFR 1/	-	-	-	-
5564	Wheeler Basin 3/	-	-	-	-
5565	Upton Mountain 3/	-	-	-	-
5566	Texaco Basin 3/	-	-	-	-
	TOTAL	.232	.183	227.400	179.274

1/ No transects taken
2/ Future sediment yield is the estimated yield which would occur in the long term, 10 years after full AMP implementation. The method of estimating future sediment yield is given in Appendix B5.
3/ Included in Allotment 5530 River

Note: Only public land acres were used in calculating sediment yield, and only on allotments with AMPs.

Table 3-8

Sediment Yield

Allotment Name and Number		Weighted Average acre-feet per square mile per year		Total Acre-feet per year	
		Present	Future2/	Present	Future2/
5101	Devine Ridge	.183	.157	2.393	2.062
5102	Prather Creek	.136	.106	.218	.170
5103	Lime Kiln	.180	.139	.930	.718
5104	Soldier Creek	.159	.120	.643	.486
5105	Camp Harney	.247	.191	5.461	4.223
5106	Cow Creek	.652	.422	3.034	3.963
5108	Little Cow Creek	.274	.185	1.187	.803
5201	Coleman Creek	.163	.108	.636	.421
5202	Hunter	.230	.230	.998	.998
5203	Catterson	.130	.130	.130	.130
5204	Slocum Field	.180	.130	.539	.389
5205	Venator	.248	.166	1.107	.742
5207	Coyote Creek	.175	.130	.300	.223
5208	Emmerson	.270	.180	.785	.523
5209	Crane	.185	.136	.559	.411
5210	Windy Point1/	-	-	-	-
5211	Beckly Home	.105	.100	.245	.233
5212	Mahan Ranch	.175	.125	1.249	.894
5213	Beaver Creek	.184	.142	2.467	1.898
5214	Hamilton1/	-	-	-	-
5215	Davies	.162	.113	.872	.606
5301	Princeton	.156	.120	4.479	3.432
5302	Big Bird	.145	.130	.582	.521
5303	Dry Lake	.143	.119	7.741	6.420
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5311	Government Field	.270	.270	.565	.565
5312	Deep Creek1/	-	-	-	-
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5316	Virginia Valley	.176	.124	4.472	3.158
5321	Hamilton Individual1/	-	-	-	-
5324	West Kiger1/	-	-	-	-
5501	E.Fk.Cow Creek	.256	.166	1.004	.649
5502	Rock Creek	.218	.158	1.365	.986
5503	Pine Creek	.160	.146	5.035	4.587
5505	Little Muddy	.278	.198	3.313	2.358
5506	Muddy	.381	.243	2.457	1.567

Table 3-8 (Continued)

Allotment Name and Number		Weighted Average acre-feet per square mile per year		Total Acre-feet per year	
		Present	Future[2]	Present	Future[2]
5507	Wolf Creek	.185	.180	.251	.245
5508	Baker Knowles	.150	.140	.198	.185
5509	William Dripp Spr.	.291	.216	.611	.454
5510	Jones Dripp Spr.	.280	.195	.333	.232
5511	Moffet Table	.202	.163	4.798	3.877
5512	Clark's River	.690	.430	.525	.327
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5517	Otis Mountain	.168	.140	3.417	2.842
5518	Newell Field	.220	.135	.340	.209
5520	Little Upson[1]	-	-	-	-
5521	Rocky Basin	.473	.311	2.789	1.832
5522	Cottonwood	.401	.259	5.263	3.403
5523	Hart	.290	.290	.579	.579
5524	Tub Springs	.346	.266	1.711	1.316
5525	Mill Gulch	.382	.249	1.353	.881
5526	Chalk Hills	.380	.270	5.313	3.778
5527	Drinkwater Summit	.554	.349	2.414	1.522
5528	Cooler	.435	.291	3.429	2.294
5529	House Butte	.389	.276	15.879	11.248
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5532	Mountain	.182	.147	9.724	7.868
5533	Buchanan	.134	.113	.487	.410
5534	Mahan Creek[1]	-	-	-	-
5535	Miller Canyon	.214	.150	2.198	1.538
5536	Alder Creek	.179	.135	8.204	6.197
5537	Buck Mountain	.162	.130	3.715	2.996
5538	Riverside	.189	.122	4.187	2.707
5541	Wilber FFR[1]	-	-	-	-
5564	Wheeler Basin[3]	-	-	-	-
5565	Upton Mountain[3]	-	-	-	-
5566	Texaco Basin[3]	-	-	-	-
	TOTAL	.232	.183	227.400	179.274

1/ No transects taken
2/ Future sediment yield is the estimated yield which would occur in the long term, 10 years after full AMP implementation. The method of estimating future sediment yield is given in Appendix B5.
3/ Included in Allotment 5530 River

Note: Only public land acres were used in calculating sediment yield, and only on allotments with AMPs.

The construction of the range improvements would temporarily increase the present sediment yield of 0.232 acre-feet per square mile per year to 0.5 acre-feet per square mile per year on seedings and to 0.6 acre-feet per square mile per year on the other range improvements. This would amount to an increase in sediment yield of 13.96 acre-feet per year from the 33,181 acres disturbed. If all the improvements were constructed in one year, sediment yield would increase 6 percent in the ES area. Since the improvements would be constructed over a 4-year period, the percent increases would be between 2 and 3 percent per year the first 2 years, between 1 and 2 percent the next year, and less than 1 percent the last year. (See Appendix B3 for methodology.) The 32,782 acres to be seeded with crested wheatgrass are expected to become revegetated within 1 year. About 272 of the 399 acres disturbed by the other improvements are expected to become revegetated within 1 to 3 years. After revegetation, sediment yields would return to the previous undisturbed levels or lower, since ground cover would increase. Impacts to water quality would be negligible from the 127 acres permanently disturbed. The proposed reservoirs would improve water quality by catching sediment that might otherwise enter perennial streams.

3.3.3 Groundwater

Approximately 4.3 acre-feet of groundwater would be withdrawn annually from the four proposed wells. This represents 0.03 percent of the total withdrawn in the Harney Basin. This depletion would not be significant especially since groundwater recharge and discharge in the area are generally in balance (Gonthier et al. 1977).

3.3.4 Water Use

Less water would reach downstream users due to construction of the proposed 230 reservoirs. Since each reservoir would hold approximately 1.5 acre-feet, the total impoundment would be 345 acre-feet. This would amount to 0.17 percent of the annual yield. Of the 230 proposed reservoirs, 139 would be in the Middle Fork Malheur River drainage. These reservoirs would store an estimated 208 acre-feet of water and could prevent that amount of water from reaching Warm Springs Reservoir. While it is not known how much, if any, water from the involved drainages presently reaches the reservoir, in a worst case situation it is assumed that all 208 acre-feet would be diverted and unavailable for irrigation purposes. This amount is 0.1 percent of the total capacity (191,000 acre feet) of the Warm Springs Reservoir. The impact of this possible reduction on irrigation water supply is unknown.

Total evaporation losses from the proposed 230 reservoirs would be 207 acre-feet per year. This would amount to 60 percent of the total water impounded behind the reservoirs. (See Appendix B4 for methodology.)

Consumptive water use by livestock would initially decrease from 70.3 acre-feet to 62.5 acre-feet of water due to the reduction in AUMs. After full AMP

implementation, consumptive use would rise to 77.4 acre-feet, a 10 percent rise over the present use. Consumptive use by livestock amounts to less than 0.03 percent of the total consumptive water use in the drainage basins in and surrounding the ES area (Upper Malheur River, South Fork Malheur River, Lower Silvies, and Lower Donner und Blitzen drainages). While studies have indicated no appreciable unappropriated surface water, some headwater streams may still be unappropriated (Oregon State Water Resources Board 1967, 1969). Since the proposed water developments are located in headwater streams, water rights may or may not be affected.

3.3.5 Conclusion

The proposed action would have a negligible long-term impact on water supply in the ES area, either on groundwater or surface water. Coliform contamination of streams by livestock would decrease slightly. Spraying 10,859 acres with 2,4-D would not significantly impact water quality of the streams in the area. Sediment yield would increase in the short term from the construction of range improvements, but would decrease by 20 percent to 0.183 acre-feet per square mile per year after full AMP implementation for a long-term general improvement in water quality.

3.4 IMPACTS ON WILDLIFE

3.4.1 Significantly Impacted Species

Only species or groups of species which would be significantly impacted by the proposed action were discussed and listed in Table 3-9. Criteria for determining significance were as follows:

1. Species threatened, endangered, or of special status.

2. Species conflicting with livestock because of wildlife requirements for food and cover.

3. Species having strong conflicts with range developments in terms of lost food, and cover.

4. Significant species in the structure or function of the ecosystem.

5. Game species with substantial numbers using public lands.

6. Nongame species with recreational values.

An example of how the criteria of significance were used is as follows: About 50-200 elk make sporadic use of public lands throughout the year. The herd is primarily dependent on U.S. Forest Service lands. The area of public

land used is relatively small and in good condition. Although the proposed action may improve the habitat slightly, there would be little if any change in elk use or populations as a result of the proposed action. Thus, no further analysis was made.

Mule deer can be taken as another example. Available data for this species (range, food habits, competition with livestock, etc.) were analyzed. This revealed a potential for strong conflicts in terms of direct food competition and cover losses from 3,000 acres of brush control. Harvest data showed that the species is economically and recreationally important to the area. This pre-analysis indicated that mule deer would be significantly impacted.

Pre-analysis indicated that mule deer, pronghorn antelope, beaver, waterfowl, valley quail and sage grouse would be significantly impacted. Nongame species (small mammals, birds, reptiles, and amphibians) would be significantly impacted as a group. Elk, mountain lions, coyotes, raptors, chukar partridge, pheasants, mourning doves and invertebrates would not be significantly impacted and are not discussed.

In general, the proposed action reduces some of the existing adverse impacts of livestock grazing, resulting in slight benefits to most species. Forage competition with big game would continue, but at reduced levels. Residual cover and current year's vegetation, although remaining relatively sparse, would increase to improve habitat for wildlife.

3.4.1.1 Data Inadequacies

Existing information is primarily related to game species and is sufficient for qualitative predictions of habitat and population changes. Data needed to predict quantitative changes in wildlife populations and habitat have not been collected. A thorough analysis of impacts from existing livestock grazing and range improvements in the ES area has not been made. Without such analysis it is difficult to predict impacts from proposed grazing and range improvements.

3.4.1.2 Methods of Analysis

The lack of wildlife data make site specific analysis difficult. Impact analysis was based primarily on four considerations:

1. Quality of habitat (food, water, cover) as based on visual observation of district personnel and limited habitat inventory.

2. Site potential to respond to specific grazing system.

3. Research applicable to the area.

4. Observations of impacts from past range developments and grazing practices.

3.4.2 Threatened and Endangered Species

Bald eagles and peregrine falcons are not known to nest on public lands in the ES area. The proposed action would not affect eagle roost sites in ponderosa pine. Raptor guards on transformers at wells would prevent electrocution. No significant impacts are expected.

Snowy plovers are not expected to use the ES area for feeding or nesting; no impacts are expected.

Changes in small mammal populations and vegetation from the proposed action would not be great enough to affect kit fox or bobcat.

3.4.3 Mule Deer and Pronghorn Antelope

These big game species are primarily impacted by actions which affect forage production, composition and availability. Water is not considered a limiting factor and cover would not be affected significantly areawide.

3.4.3.1 Forage Allocation

The proposed initial forage allocation would result in more vegetation being left for wildlife use. The benefit of this action is primarily due to reductions in livestock use to grazing capacity. These reductions range from 23 to 69 percent on 34 allotments (Table 3-9). The actual wildlife allocation accounts for only a small part of the total reduction. For example, in Allotment 5213, livestock would be reduced 300 AUMs and wildlife would be allocated 6 AUMs. Methods used to determine allocation to deer and antelope are in Appendix B8.

Initial allocation would result in substantial short term cattle reductions on big game ranges (Figures 2-7 and 2-8). Forage competition would be moderately reduced. Decreased stocking rates would increase food in the long term by increasing grass and shrub vigor. However, during certain seasons and years, desirable browse species such as squaw apple and bitterbrush would continue to be heavily grazed. Projected livestock increases would not exceed increased livestock forage. The projected allocation would maintain reduced competition with livestock and increased browse productivity.

3.4.3.2 Grazing Systems

On 26,000 acres in eight allotments (Table 3-9) deferred and continuous grazing results in late season cattle use each year in the same pastures.

Combined deer and cattle grazing in these pastures results in excessive utilization and eventual loss or decreased productivity of desirable shrubs. Direct food competition and decreased vegetative productivity may result in low fat reserves in big game animals. Low fat reserves in the fall can be expected to increase winter mortality, especially with juvenile animals.

Rest rotation and deferred rotation systems alternate early grazing, late grazing, and rest among several pastures. These systems have the least amount of adverse impact because big game can usually move to the pasture with the best forage conditions. Forage competition would occur if all or most of the browse is in one pasture rather than equally distributed. Allotments and pastures in the ES area are relatively small which makes it unlikely that all of the browse in a large area would be heavily used in any one year.

Proposed changes in grazing systems (new systems) and the continuation of some existing systems would benefit big game by providing increased forage on 176,000 acres of habitat in 30 allotments (Table 3-9). New systems would increase available forage for deer and antelope where continuous grazing is replaced with deferred rotation and rest rotation. Existing systems, when combined with forage allocation and range improvements, would increase forage significantly on 15 allotments.

Riparian vegetation along 38 stream miles would provide increased forage and cover with grazing exclusion, restricted use, early grazing and rested pastures. Forage competition would remain high along 37 miles of stream with deferred, deferred rotation, rotation, and continuous grazing.

3.4.3.3 Range Improvements

New reservoirs would moderately increase forage competition by allowing cattle to graze in areas previously used primarily by big game. These new water sources would slightly reduce competition use at existing waters, and increase big game distribution.

Approximately 500 miles of fence in big game habitat has not had any significant adverse impacts. Antelope readily go under the 16-inch space on barbed wire fences. No significant adverse impacts are expected from the proposed fences.

Sagebrush control would adversely affect deer by reducing forage and cover. Antelope would be benefited because they are adapted to open areas which allow free movement. If the proposed sagebrush control on 10,859 acres is accomplished by spraying 2,4-D, deer and antelope would temporarily lose desirable forbs. Standing dead brush would continue to impede antelope movement for 3-5 years. In a worst case situation, leave strips could be accidently sprayed because of wind drift and overlap. Food and cover may be lost.

Brush beating would eliminate standing sagebrush and benefit antelope immediately. Desirable forbs would not be lost. Leave strips could be precisely

located because treated areas are easily distinguished from untreated areas. The best food and cover in an area could be saved.

Crested wheatgrass and yellow sweetclover seedings would improve spring forage, slightly benefiting big game.

3.4.3.4 Conclusions

Impacts to deer and antelope habitat are displayed in Table 3-9. Overall, the proposed action would allow for moderately increased deer populations and slightly increased antelope populations due to long-term increases in available forage.

3.4.4 Beaver

The combination of beaver and livestock has eliminated large amounts of woody vegetation from most streams. Beaver cut dense growths of aspen, alder, and willow which had protected streams from concentrated livestock use. Livestock then concentrate along streams and remove all or most of the regrowth. Riparian areas with little regrowth are unable to produce sufficient mature aspen, willow, and alder to support beaver. Present beaver habitat on public lands is limited to 2.5 stream miles along Smyth Creek and Stinkingwater Creek (Figure 2-9).

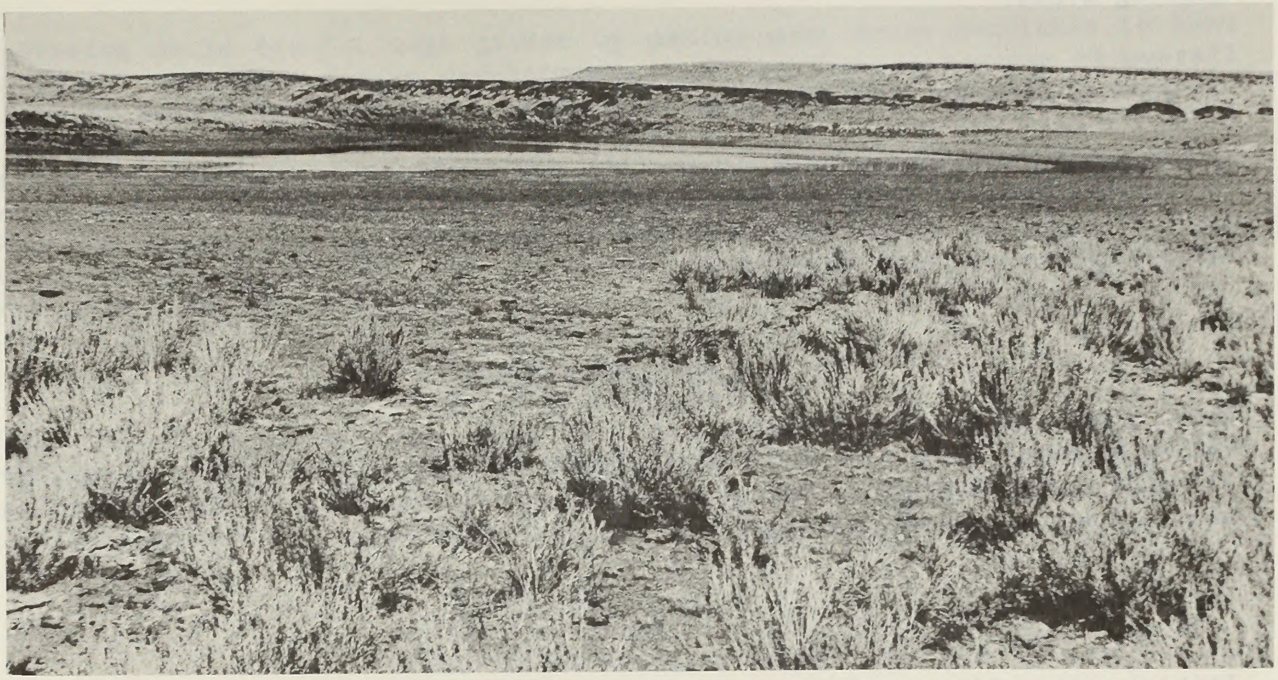
Forage allocation in conjunction with fencing would eliminate grazing from 2.5 stream miles presently occupied by beaver. Willow, alder and aspen would increase, thus supporting present populations and allowing for slight increases in beaver.

3.4.5 Waterfowl

Impacts to waterfowl, shorebirds, and similar water associated birds are primarily those which affect nesting (Figure 2-9).

3.4.5.1 Forage Allocation

Forage allocation in conjunction with additional fencing and new water developments would eliminate or restrict livestock grazing on 2,225 acres of nesting habitat (Table 1-8, Table 3-9). Increased residual cover from the previous growing season would improve nesting success (Mundinger 1975). With livestock competition eliminated, increased food plants would be available for waterfowl.



Mahon Reservoir in Allotment 5315 provides little nesting cover because of heavy use by livestock, September 1978. Proposed elimination of grazing would permit residual cover to accumulate and increase nesting success.

3.4.5.2 Grazing Systems

Deferred rotation grazing around Dry Lake would be replaced with a modified rest rotation system. Only one nesting season out of four would be affected by grazing. Rest treatments during the growing season combined with restricted use would improve nesting success by greatly increasing residual cover and food.

3.4.5.3 Range Improvements

Proposed reservoirs without fencing would improve habitat slightly by providing new nesting and feeding areas. New habitat would be poor for most species because concentrated cattle use at the water's edge would result in trampled nests and reduced cover. If salt blocks are placed close to new or existing reservoirs, impacts of trampling and heavy livestock utilization would be increased.

Proposed grazing exclusion by fencing at 10 new reservoirs would allow excellent nesting cover and food to be established. Waterfowl reproduction at fenced reservoirs is expected to be one or two broods annually.

Seedings would improve habitat slightly for geese by providing additional feeding areas.

3.4.5.4 Conclusions

Grazing elimination, restricted use and new reservoirs would greatly increase or improve nesting habitat and food for waterfowl. Annual waterfowl production is expected to increase from 240 ducks and 160 geese to over 1,000 ducks and 250 geese.

3.4.6 Sage Grouse

Good condition meadows provide succulent forbs and insects to broods during the critical summer period (Savage 1969). Residual vegetation is important for successful nesting. The proposed action would affect brood survival and nesting success through changes in residual vegetation and meadow condition.

3.4.6.1 Forage Allocation

Initial allocation would reduce livestock AUMs 33 percent in sage grouse habitat (Figure 2-8) resulting in slightly improved nesting success and forb availability.

Restrictive use pastures and livestock exclosures would increase succulent vegetation and cover on 80 riparian/meadow acres.

Projected allocation would increase livestock numbers resulting in a minor increase of nest disturbance. However, there would also be an increase of food and cover which would be of minor benefit.

3.4.6.2 Grazing Systems

The early grazing system, which provides the most residual vegetation, has the least adverse impact to sage grouse nesting. Deferred grazing results in less residual vegetation, followed by rest rotation, deferred rotation, rotation, and continuous grazing. Continuous grazing on 89,897 acres would be replaced with deferred rotation and rest rotation, slightly improving nesting habitat.

Rest rotation and early grazing systems would increase forbs and cover available to grouse, slightly improving brood-rearing habitat on 70 acres (Table 3-9). Concentrated livestock use in meadows would occur each year with continuous, deferred, deferred rotation, and rotation systems. Competition for forbs would remain high and meadow condition would remain poor, resulting in moderately reduced food and cover for broods.

3.4.6.3 Range Improvements

Reservoirs would benefit sage grouse by making more areas available to them during dry periods. Spring developments would be adverse because of overall losses of meadow vegetation due to the placement of water collection devices.

Removal of sagebrush on 2,884 acres (Allotment 5529) would result in detrimental losses of food and cover. Spraying would reduce desirable forbs in addition to sagebrush. Seedings in brush control areas would result in increased stocking rates, which could adversely affect nesting. Sweetclover in seedings would improve food.

3.4.6.4 Conclusions

While brush control and spring developments would have a minor adverse effect on sage grouse, overall the proposed action would slightly improve habitat.

3.4.7 Valley Quail

3.4.7.1 Forage Allocation

Restricted use and grazing exclusion would increase woody and herbaceous vegetation along 22 stream miles (Tables 1-4 and 1-8). Valley quail would be benefited by greatly improved nesting cover, winter cover and food.

3.4.7.2 Grazing Systems

Rest rotation and early grazing would improve woody and herbaceous vegetation along 16 stream miles. Nesting cover, winter cover and food would be slightly improved. Woody riparian vegetation would not improve along 37 stream miles with continuous, deferred, deferred rotation, and rotation grazing systems. Winter cover would remain in poor condition due to heavy livestock use.

3.4.7.3 Range Improvements

An estimated 25 miles of fence would be built to facilitate restrictive use and forage allocation. Impacts would be the same as for forage allocation.

3.4.7.4 Conclusion

Improved woody riparian vegetation along 38 stream miles is expected to sustain larger winter populations and increase nesting success. Populations would remain the same or decline along 37 stream miles where woody riparian vegetation would continue in mostly poor condition.

3.4.8 Nongame Wildlife

Nongame birds, mammals, amphibians and reptiles are grouped for impact analysis. There are insufficient site specific data to justify treating these groups separately. Impacts are described in general terms and covering very broad areas; detailed analysis is not possible because site specific or species specific impacts from existing livestock management or proposed management are largely unknown. Nongame wildlife is primarily impacted through changes in quality of riparian vegetation, amount of residual vegetation, and vegetative composition. Impacts in riparian areas are significant because these areas contain the greatest densities and variety of species. Residual vegetation in all areas is very important for reproduction, escape from predators, and maintenance of body temperatures. Long-term, subtle changes in vegetative composition would improve habitat for some species and have adverse impacts on others (Egeline 1978). Increased ground cover with perennial grasses may increase Rocky Mountain cottontails, least chipmunks, and deer mice. Black-tailed jackrabbits and kangaroo rats which are adapted to disturbed areas may decrease as annual grasses and forbs are replaced with perennials.

3.4.8.1 Forage Allocation

Decreased livestock use from initial allocation would increase residual and current year's vegetation. Benefits from increased vegetation would be maintained with projected allocation since livestock increases would not exceed increases in livestock forage. Projected allocation would increase livestock numbers resulting in a slight increase of nest disturbance.

Restrictive use and grazing exclusion would greatly improve about 425 acres of riparian vegetation to good condition for nongame species (Table 3-9); winter cover, nesting cover, and food would be increased. Comparison of good quality riparian habitat to adjacent poor quality habitat on the Middle Fork Malheur River by BLM personnel in August 1976 found twice as many song birds and twice the number of species in the good habitat.

Overall, numbers and distribution of species would be expected to increase slightly as a result of initial allocation.

3.4.8.2 Grazing Systems

The proposed action would improve overall residual vegetation and current year's growth, slightly benefiting most species. Early grazing systems have the least adverse impact by providing the greatest amounts of residual and current year's growth. Deferred systems result in less residual cover, followed by rest rotation, deferred rotation, rotation, and continuous grazing. Proposed replacement of continuous grazing with deferred rotation and rest rotation would increase residual vegetation on about 90,000 acres. Many

species would be benefited especially ground nesters such as horned larks and deer mice. Adverse impacts from unchanged continuous systems (83,558 acres) would be lessened by limiting livestock utilization of key species to 50 percent. Existing systems on 16 allotments would improve residual cover and perennial grasses as a result of forage allocation and range improvements (Table 3-9).

Rest rotation and early grazing would improve riparian vegetation along 16 miles of perennial streams. Increased nesting sites and winter cover would moderately benefit nongame species. Riparian vegetation along 37 miles of perennial stream would continue to be heavily used by livestock and would remain in poor or fair condition. Nongame populations would remain the same or decrease because of few nesting sites and sparse cover.

The 1,550 acre Dry Lake pasture (Allotment 5303) would essentially be rested 3 out of every 4 years. All types of nongame wildlife, especially birds, would be greatly benefited from increased vegetation.

Critical habitat associated with undeveloped springs and existing reservoirs would remain in generally poor condition. These areas are heavily used under any grazing system. Placement of salt blocks near water would continue to contribute to the poor condition of these areas.

3.4.8.3 Range Improvements

An estimated 40 percent of existing spring developments in the ES area are not beneficial to wildlife. This trend is expected to continue with the proposed 109 additional springs. Overflow water and resulting riparian vegetation would be of minor benefit. Fenced exclosures at spring boxes and overflow areas would provide a minor amount of improved cover. Surface water would be dried up at an unknown number of springs heads. Decreased riparian vegetation at spring heads, especially immediately after development, would constitute a moderate adverse impact. Occasional drownings of small birds and mammals would occur in troughs despite escape ramps.

Increased distribution of water from new reservoirs would increase distribution and numbers of species such as the mountain cottontail, Brewer's blackbird and spotted frog. Full potential of 220 new reservoirs would not be realized because there would be no protection of vegetation at the water's edge during grazing seasons. Dense herbaceous vegetation and trees would not become established, making these new reservoirs poor habitat for reproducing, hiding, or perching.

Proposed grazing exclusion by fencing at 10 new reservoirs would allow dense herbaceous vegetation and possibly woody riparian species to be established at the water's edge. New nesting sites and excellent cover adjacent to water would be greatly beneficial to many nongame species.

Elimination of sagebrush by spraying herbicides or brush beating would have an adverse impact. Leave patches of big sagebrush would not entirely offset losses of food and cover. Seeding would result in greater livestock use levels and densities than at present. Nest disturbance would increase; food and cover would be decreased.

Spraying would further reduce food supplies by eliminating some forbs. In a worst case situation, drift may result in important food and cover patches being sprayed.

Brush beating would not have significant impacts to forbs. Important food and cover patches can be precisely located and easily avoided with brush beating.

3.4.8.4 Conclusion

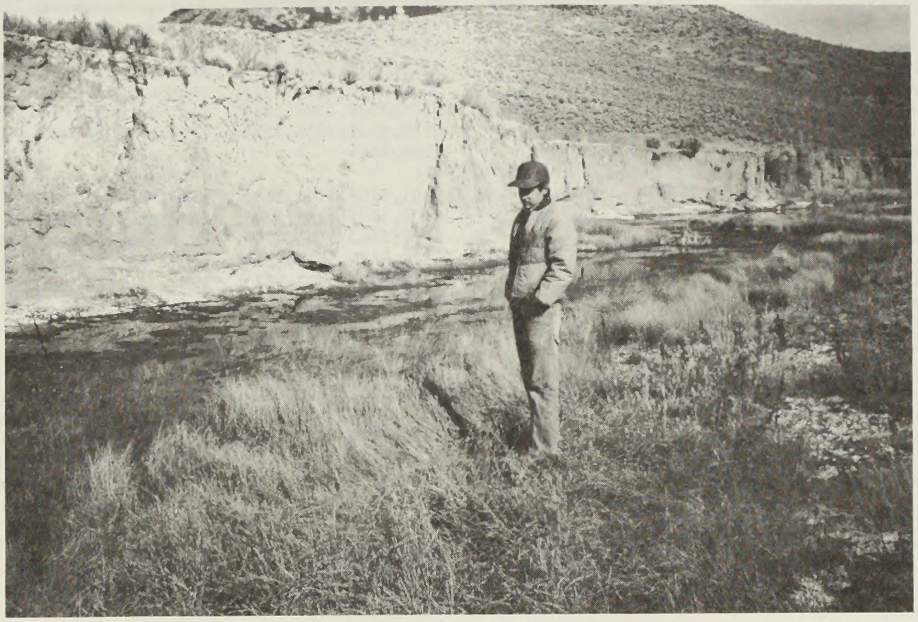
Increased perennial grass production, improved riparian habitat and new reservoirs would result in increased numbers and distribution of most species. As range condition improves, some species such as black-tailed jackrabbits may decrease in response to decreased annuals. Seedings with brush control and spring developments would have slightly adverse impacts despite mitigating design features.

3.4.9 Fish

The proposed action would affect fish primarily through changes in bank stability and riparian vegetation. Condition and trend data collected by the BLM during 1974-76 is the basis for most impact predictions (Table 2-10 and Appendix B7).

3.4.9.1 Forage Allocation

Restricted use and grazing exclusion would increase fish production and improve habitat along 18 public stream miles (Table 3-9, Figure 1-2). Excluding livestock from damaged stream areas is a proven management technique to increase fish production. Successful streambank fencing projects have been documented in Oregon (Winegar 1977), Utah (Duff 1978), and elsewhere. Beneficial effects of improved riparian vegetation include stabilized streambanks, increased shading, decreased flooding, reduced silt, and increased summer flows.



Riparian vegetation along Stinkingwater Creek grazed with a deferred rotation system, October 1978. Proposed livestock exclusion would improve fish habitat by allowing willows to be established.

3.4.9.2 Grazing Systems

Rest rotation grazing along 10 public stream miles is expected to improve fish habitat by increasing woody and herbaceous vegetation. Observations by district personnel indicate that habitat along Rattlesnake Creek (Allotment 5105) have shown significant improvement during the past 5 years with rest rotation. Riparian vegetation was rested 1 year and then lightly grazed for a short period during early summer. Cattle are less likely to concentrate along streams early in the summer because of abundant green growth in the uplands and low air temperatures.

Fish habitat would remain in mostly poor/fair condition with downward trend along 10 public stream miles as a result of heavy livestock use and severe bank trampling by cattle (Table 3-9). If salt blocks are placed along streams, livestock would be further concentrated in these locations. Grazing systems along these streams would not improve riparian vegetation or decrease bank trampling.

Cottonwood Reservoir and Warm Springs Reservoir would continue in poor/ fair condition as a result of fluctuating water levels. Grazing along the

Table 3-9

Impacts to Wildlife

MULE DEER

Proposed Action Component	Habitat Affected Figure 2-7 (public acres)*	Impact on Habitat 1/	Allotments	Rationale
FORAGE ALLOCATION				
Initial allocation	83,000 critical (81%) 68,000 non-critical (38%)	++ Long Term	5101,5106,5108,5202, 5203,5501,5502,5503, 5505,5506,5508,5509, 5511,5513,5514,5515, 5519,5522,5523,5524, 5525,5526,5527,5529, 5530,5531,5535,5536, 5538,5564	Average livestock reduction of 28% would increase forage available to deer. Grazing systems with initial allocation would improve grass and shrub vigor. Increased productivity would benefit deer. Restricted use and livestock exclosures along 22 stream miles would improve food and cover for deer.
Projected allocation	101,000 critical (99%) 66,000 non-critical (37%)	++ Long term	5101,5108,5104,5105, 5106,5202,5203,5307, 5501,5502,5505,5506, 5508,5511,5513,5514, 5515,5521,5522,5523, 5525,5576,5527,5528, 5530,5535,5536,5538, 5536	Livestock increases would not be made until increased forage is available. Livestock increases of 8,121 AUMs on deer ranges would be offset by an increase of 9,532 AUMs. Forage available to deer would remain about the same as in initial allocation.
GRAZING SYSTEMS				
New Systems	42,000 critical (41%) 44,000 non-critical (25%)	++ Long term	5108,5202,5208,5307, 5501,5506,5513,5514, 5521,5525,5527,5535, 5536,5537,5538	Adverse continuous grazing replaced with deferred rotation and rest rotation. Increased forage would be available in rested and deferred pastures. Improved grass and shrub vigor would result from rest during critical growing periods.
Existing Systems	40,000 critical (39%) 50,000 non-critical (28%)	+ Long term	5101,5106,5203,5505, 5508,5509,5511,5514, 5515,5522,5523,5524, 5529,5530,5564	Existing systems with initial allocation and range improvements would increase grass and shrub vigor. More forage would be left for deer use.
	750 critical (1%) 11,500 non-critical (6%)	--- Long Term	5503, 5531	Same season of use each year (4/16 to 8/30 and 7/1 to 9/15) would increase forage competition as desirable browse productivity decreased.
	600 critical (1%) 13,000 non-critical (7%)	-- Long Term	5313,5510,5512,5517, 5518,5529	Increased competition and reduced browse production as a result of late season grazing each year (deferred or continuous systems). Reduced grass production on old seedings and brush control areas would increase competition with deer (Hyder and Sneva 1963; Sneva 1971).
RANGE IMPROVEMENTS				
Reservoirs	4,000 non-critical (2%)	++ Long term	5530	Water would be available in midsummer where it is now a limiting factor.
	750 critical (1%) 30,000 non-critical (17%)	-- Long Term	5529,5503,5532	Expanded cattle use would increase competition above existing level.
Brush control (Spray)	3,000 non-critical (2%)	-- Long Term	5529,5101	Decreased shrubs and desirable forbs. Poor control of leave strips.
Brush control (Brush beat)	3,000 non-critical (2%)	- Long term	5529,5101	Decreased shrubs. Good control of leave strips.
Seedings	8,444 critical (8%) 3,980 non-critial (3%)	+ Long term	5101,5203,5205,5307, 5511,5513,5521,5525, 5528,5529,5536,5538, 5701	Increased grass and sweetclover during late spring when annuals become dry.
Fences	45 miles (unquantifiable acreage)	No change	5202,5308,5503,5506, 5511,5513,5521,5525, 5520,5537	Existing 300 miles of fence in deer ranges have not had any significant adverse impacts. Additional fences would not change present situation significantly.

Summary

Forage increases outweigh forage decreases and losses of cover. Overall improved habitat would allow for moderately increased numbers.

* Percent of public habitat in parenthesis; public critical acres: 102,000; public non-critical acres: 178,000

Table 3-9 Impacts to Wildlife (Continued)

PRONGHORN ANTELOPE

Proposed Action Component	Habitat Affected Figure 2-8 (public acres)*	Impact on Habitat 1/	Allotments	Rationale
FORAGE ALLOCATION				
Initial allocation	55,000 yearlong (49%) 71,000 summer (43%)	+ Long Term	5202,5203,5213,5303, 5304,5316,5502,5505, 5506,5509,5511,5513, 5529,5530,5531,5538, 5565,5566	Overall 14% decrease of livestock AUMs in antelope ranges would increase available forage. Reductions would allow grazing systems to quickly increase plant vigor and production, thus benefiting antelope. Restricted use and livestock exclosures along 22 stream miles would improve food and cover.
Projected allocation	86,000 yearlong (76%) 63,000 summer (38%)	+ Long term	5202,5203,5213,5501, 5505,5506,5509,5511, 5513,5529,5530,5531, 5536,5538,5565,5566	Increased forage available to livestock would offset livestock increases. Livestock would increase by 11,537 AUMs while available vegetation would increase 12,737 AUMs. Forage available to antelope would not be decreased from initial allocation levels.
GRAZING SYSTEMS				
New Systems	25,000 yearlong (22%) 11,000 summer (7%)	++ Long Term	5202,5215,5301,5307, 5506,5513,5537,5538	Adverse continuous grazing replaced with more desirable deferred rotation and rest rotation. New sources of forage available in rested and deferred pastures. Systems would eventually increase overall vegetative production, thus benefiting antelope.
Existing Systems	24,000 yearlong (21%) 61,000 summer (37%)	+ Long term	5203,5212,5213,5315, 5316,5505,5509,5511, 5529,5530,5531,5566	Systems with livestock reductions and range improvements would increase forage available to antelope.
	17,000 summer (10%)	-- Long Term	5313,5503	Competition would increase with continuous systems.
RANGE IMPROVEMENTS				
Wells-Pipelines Reservoirs	29,000 yearlong (26%) 31,000 summer (19%)	-- Long Term	5301,5313,5502,5503, 5528,5529,5532	Greatly expanded cattle use and resulting competition would offset benefits of improved livestock distribution. Water is not a limiting factor for antelope.
Brush Control (Spray)	7,000 summer (4%) 1,500 yearlong (1%)	+ Long term	5303,5529	Removal of high cover would allow for improved antelope movement. Forbs would be decreaed; dead brush would remain standing 3-5 years.
Brush Control (Brush beat)	7,000 summer (4%) 1,500 yearlong (1%)	++ Long term	5303,5529	Removal of high cover would allow for improved antelope movement. Forbs would not be decreased; dead brush would be physically knocked down.
Seedings	8,600 summer (5%) 14,500 yearlong (13%)	+ Long term	5303,5304,5307,5315, 5501,5511,5529,5530, 5531,5536,5538	Increased grass and sweetclover for antelope, especially during spring.
Fences	24 miles (unquantifiable acreage)	No change	5215,5307,5315,5503, 5506,5537,5538	Existing 400 miles of fence in antelope range have not had any significant adverse impacts. Additional fence would not change present situation significantly.

SUMMARY

Forage increases from initial allocation, grazing systems and seedings outweigh adverse impacts from water developments and forage competition. Overall improved habitat would allow the population to increase slightly.

* Percent of public habitat in parenthesis; Public yearlong range: 113,000 acres; Public summer range: 165,000

Table 3-9 Impacts to Wildlife (Continued)

SAGE GROUSE

Proposed Action Component	Habitat Affected Figure 2-8 (public acres)	Impact on Habitat 1/	Allotments	Rationale
FORAGE ALLOCATION				
Initial Allocation	173,459	+ Long Term	5101,5106,5202,5203, 5213,5505,5508,5509, 5514,5515,5521,5522, 5524,5525,5527,5528, 5529,5530,5531,5535, 5536,5564	Livestock AUMs would be decreased 33%. Reduced nest disturbance and improved cover would increase nesting success. More succulent forbs and possibly more insects would be available to improve brood survival.
Projected Allocation	192,524	+ Long Term	5101,5103,5104,5105, 5106,5202,5203,5213, 5501,5505,5506,5508, 5509,5511,5514,5515, 5521,5522,5523,5524, 5525,5526,5527,5528, 5530,5531,5534,5535, 5536,5564	Livestock would use a much smaller proportion of the available AUMs than at present. Livestock increases would be offset by increased available forage. Increased nest disturbance and trampling would be offset by improved food and cover.
	Estimated 80 acres of Riparian/meadow vegetation	++ Long Term	5105,5307,5309,5310, 5506,5511,5514,5522, 5529,5532,5536	Greatly reduced livestock AUM's in restrictive use pastures and livestock exclosures would increase succulent vegetation and cover available to grouse.
GRAZING SYSTEMS				
New Systems	80,690	+ Long Term	5108,5202,5208,5215, 5307,5501,5513,5514, 5521,5525,5536,5537	Adverse continuous grazing would be replaced with primarily deferred rotation and rest rotation. Improved nesting cover and ungrazed forbs would be available to increase nesting success and survival of young.
Existing Systems	Estimated 70 acres of Riparian/meadow vegetation	+ Long Term	5101,5105,5517,5538, 5564	Rest rotation and early grazing systems along streams would increase succulent vegetation available to grouse.
Existing Systems	Estimated 130 acres of Riparian/meadow vegetation	No Change in Poor/Fair condition	5205,5307,5312,5313, 5315,5503,5531,5532, 5536,5537,5536	Competition for forbs would remain high and meadow vegetation would remain in poor condition due to concentrated livestock use each year with continuous, deferred, deferred rotation and rotation systems.
Existing Systems	98,000 acres	+ Long Term	5101,5105,5106,5213, 5505,5509,5515,5517, 5522,5524,5528,5530, 5535,5564	Existing systems with initial allocation and range improvements would increase succulent vegetation and cover.
RANGE IMPROVEMENTS				
Spring Development	Estimated 10 acres	-- Short Term - Long Term	Table 1-6	Loss of meadow vegetation at spring source would not be offset by increases at overflow area, especially immediately after development.
Reservoirs	Estimated 20,000 acres	+ Long Term	Table 1-6	Increased sage grouse distribution during summer periods of limited water.
Brush Control (Spray)	2,884	-- Long Term	5529	Decreased sagebrush needed for nesting.
Brush Control (Spray)	2,884	- Short Term	5529	Temporary loss of some forbs may decrease insects.
Brush Control (Brush Beat)	2,884	- Long term	5529	Decreased sagebrush needed for nesting. Forbs and insects would not be lost.
Seeding	2,884	- Long term	5529	Grazing intensity would increase to 80% utilization, adversely affecting cover. Nesting disturbance would increase.

SUMMARY

Habitat would be slightly improved areawide. Increased food, cover, and water distribution outweigh adverse impacts from spring development, sagebrush control, and continued poor meadow condition. Habitat improvement should not be interpreted to mean increased sage grouse numbers. Over the past 10 years sage grouse have declined from abundant to scarce due to unknown causes.

Table 3-9 Impacts to Wildlife (Continued)

BEAVER

Proposed Action Component	Habitat Affected Figure 2-9 (Public Stream Miles/Acres)	Impact on Habitat 1/	Allotments	Rationale
FORAGE ALLOCATION				
	48 acres along 2.5 stream miles	+++ Long Term	5307,5532	Forage allocation in conjunction with fencing would exclude livestock from these areas. Dense growths of willow, alder, and aspen would be established in exclosures which would increase food available to beaver.
Range Improvements				
Fencing	48 acres along 2.5 stream miles	+++ Long Term	5307,5532	Fences would facilitate forage allocation by excluding livestock.

Summary

Beaver are expected to maintain present numbers or increase in response to increased woody riparian vegetation.

VALLEY QUAIL

Proposed Action Component	Habitat Affected Figure 2-4 (Public Stream Miles/Acres)	Impact on Habitat 1/	Allotments	Rationale
FORAGE ALLOCATION	88 acres along 22 stream miles	+++ Long Term	5105,5307,5309,5310, 5506,5511,5514,5522, 5532,5536	Reduced livestock AUMs in restrictive use pastures and livestock exclosures would would allow more vegetation to be established or left along streams. Winter cover, nesting cover and food would be increased.
GRAZING SYSTEMS				cover, nesting cover and food would be increased.
GRAZING SYSTEMS	64 acres along 16 stream miles	+ Long Term	5101,5105,5517,5538, 5564	Rest rotation and early grazing would improve woody cover and herbaceous food.
	148 acres along 37 stream miles	No Change in poor/fair condition	5205,5307,5312,5313, 5315,5503,5531,5532 5536,5537,	Woody cover would not improve with continuous, deferred, deferred rotation and rotation and rotation systems.
RANGE IMPROVEMENTS				
Fences	Estimated 25 miles	+++ Long Term	5105,5307,5309,5310, 5506,5511,5514,5522, 5532,5536	Fencing would facilitate forage allocation by restricting or eliminating livestock use. Rationale for impacts is the same as for forage allocation.

SUMMARY

Improved woody riparian vegetation along 38 stream miles is expected to sustain larger winter populations and increase nesting success.

Table 3-9 Impacts to Wildlife (Continued)

WATERFOWL

Proposed Action Component	Habitat Affected Figure 2-9 (public acres)	Impact on Habitat 1/	Allotments	Rationale
FORAGE ALLOCATION				
	2,225	+++ Long Term	5303,5307,5315,5529, 5530,5566	The reduction of livestock AUM's in restrictive use pastures and the elimination of livestock from selected reservoirs would allow more vegetation to be established. Increased residual cover would improve nesting success. Increased food plants would be available to waterfowl.
GRAZING SYSTEMS				
New Systems	1,550 acres	+++ Long Term	5303	Deferred rotation system would be replaced with a rest rotation system. Nesting cover and food plants would be essentially grazed once every 4 years instead of each year. Nesting cover and food would be increased.
RANGE IMPROVEMENT				
Reservoirs (220)	880 acres	+ Long Term	Table 1-6	New nesting sites would be created but they would be of poor quality. Full potential would not be realized since nesting habitat at the water's edge would not be protected from livestock.
Fenced Reservoirs (10)	40 acres	+++ Long Term	Undetermined	Exclusion of livestock would allow excellent nesting cover to be established at 10 new sites which have the gratest potential for waterfowl habitat.
Seedings	32,782 acres	+ Long term	Table 1-6	Seedings would provide additional feeding areas for geese.

SUMMARY

Increased residual cover and food would improve 2,265 acres of habitat. Seedings would increase feeding areas for Geese. Waterfowl production on public lands would be expected to increase from 240 ducks and 160 Canada geese to over 1,000 ducks and 250 geese within 3 years.

Table 3-9 Impacta to Wildlife (Continued)

NONGAME WILDLIFE

Proposed Action Component	Habitat Affected (public acrea)	Impact on Habitat 1/	Allotmenta	Rationale
FORAGE ALLOCATION				
Initial Allocation	143,000	++ Long Term	5101,5106,5202,5203,5213, 5505,5508,5509,5514,5515, 5521,5522,5524,5525,5526, 5527,5528,5529,5530,5535, 5538	Liveatock AUMs would be reduced an average of 33%. Decreased uae would increase residual vegetation and perennial grasses. Food and cover would be improved.
Projected Allocation	115,775	+ Long term	5101,5103,5104,5105,5106, 5202,5203,5211,5213,5505, 5506,5508,5509,5514,5515, 5521,5522,5523,5524,5525, 5527,5530,5534,5535,5564	Increased residual cover and ungrazed green vegetation would maintain or increase overall numbers. Livestock would use a much smaller proportion of the available AUMs. Projected livestock increases would be moderated by increased available forage.
	Estimated 425 acres of riparian/ meadow vegetation	+++ Long Term	5105,5303,5307,5309,5310, 5315,5506,5511,5514,5522, 5524,5530,5532,5536	Reduced livestock AUMs in restrictive use pastures and the elimination of grazing in some areas would allow more vegetation to be left along 22 stream miles and around 6 reservoirs. Winter cover, nesting cover and food would be increased or improved.
GRAZING SYSTEMS				
New Systems	89,897	+ Long term	5108,5202,5208,5215,5301, 5307,5501,5513,5514,5521, 5525,5536,5537	Adverse continuous grazing would be replaced with primarily deferred rotation and rest rotation. Increased residual cover and grass vigor would improve habitat for most species.
New Systems	1,550	+++ Long Term	5303	Deferred rotation system would be replaced with a rest rotation system. Nesting cover and food plants would be essentially grazed once every 4 years instead of each year.
Existing Systems	70 (riparian)	+ Long Term	5101,5105,5517,5564	Rest rotation and early grazing systems would improve woody riparian vegetation and increase herbaceous understory; nesting cover and food would be improved.
Existing Systems	130 (riparian)	No change in poor/fair condition	5205,5307,5312,5313,5315, 5503,5531,5532	Continuous, deferred, deferred rotation and rotation systems would not improve woody riparian vegetation required by tree nesters.
Existing Systema	88,893	+ Long term	5101,5106,5202,5203,5213, 5505,5308,5514,5515,5522, 5524,5525,5527,5528,5530, 5535	Grazing systems with reduced stocking rates and range improvements would improve residual cover and perennial grasses.
RANGE IMPROVEMENTS				
Springs, Pipelines Wells	200 acres	-- Short Term - Long Term	Table 1-6	Exclosures and bird ramps would not entirely eliminate adverse impacts. Riparian vegetation would be lost at spring heads, small mammals and birds would drown at troughs.
Reservoirs (220)	900 acres	+ Long Term	Table 1-6	Increased distribution of ground level water would increase distribution and numbers of many species. Heavy grazing and trampling waters edge would eliminate cover needed for reproduction and escape.
Fenced Reservoirs (10)	40 acres	+++ Long Term	Undetermined	Dense herbaceous vegetation and possibly trees would be established at the water's edge. Excellent cover adjacent to water would provide new habitat for many species.
Brush Control (Spray)	18,030	- Long Term	5303,5529,5101	Leave patches of big sagebrush would not entirely offset adverse effects of sagebrush control.
Brush Control (Brush-beat)	18,030	- Long term	5303,5529,5101	Decreased sagebrush needed for nesting. Forbs and insects would not be decreased.
Seeding	18,030	- Long term	5303,5529,5101	Grazing utilization would increase to 80%, adversely affecting cover.

SUMMARY

Increased residual cover, perennial grass production and water distribution would result in increased numbers and distribution of most species. As range condition improves, some species may decrease in response to decreased annuals. Seedings with brush control and spring developmenta would have slightly adverse impacts despite mitigating design features.

Table 3-9 Impacts to Wildlife (Continued)

FISH

Proposed Action Component	Habitat Affected Figure 2-9 (public stream miles)	Existing Condition2/	Resulting Condition	Impact on Habitat1/	Allotments	Rationale
FORAGE ALLOCATION						
Initial/ Projected Allocation	Smyth Cr. 2.9	Poor-Fair	Fair-Good	+++Long Term	5307	Forage allocation in conjunction with fencing would exclude livestock from these areas. Increased woody and herbaceous vegetation would stabilize banks. Increased shading and stream depths would increase fish production.
	Riddle Cr. 1.0	Fair-Good	Good-Exellent	+++Long Term	5309,5310	
	Cottonwood .6	Poor	Fair	+++Long Term	5522	
	Stinkingwater 2.2	Poor-Fair	Fair-Good	+++Long Term	5529,5532	
	Coleman Cr. 2.0	Poor-Fair	Good	+++Long Term	5536	
	Paul Cr. .9	Poor	Fair	+++Long Term	5310	
	Bluebucket 1.4	Poor-Fair	Fair-Good	++Long Term	5511	Forage allocation in conjunction with fencing would reduce livestock use to a maximum of 50% of the riparian vegetative production. Increased woody and herbaceous vegetation would stabilize banks, increase shading and increase stream depths.
	M.F. Malheur 2.3	Fair	Fair-Good	++Long Term	5511	
	Alder Cr. 2.1	Poor-Fair	Fair-Good	++Long Term	5536	
	Rattlesnake Cr. 2.7	Poor-Fair	Fair-Good	++Long Term	5105	
	32 Stream Miles	Poor-Good	Poor-Good	+Long Term	Table 2-10	Increased vegetative cover on watersheds would decrease sediments in streams.
GRAZING SYSTEMS						
	Coleman Cr. 3.4	Poor-Fair	Fair	+Long Term	5536	Continuous grazing would be replaced with 2 pasture rest rotation existing willows would reproduce and grow to provide bank stability and shade.
	Alder Cr. 2.1	Poor-Fair	Fair-Good	+++Long Term	5536	
	M.F. Malheur River .8	Poor-Fair	Poor-Fair	No Change	5530	Annual winter use would not allow for shrub cover improvement. Cattle would continue to concentrate in the stream bottom.
	Bluebucket Cr. 1.5	Poor	Poor	No Change	5511	Cattle would continue to trample banks and make heavy use of riparian vegetation. Habitat would remain in mostly poor/fair condition with static or downward trend (Armour 1977). Large boulders on .3 miles of Stinkingwater Creek protect it from cattle and maintain the stream in excellent condition.
	Lee Cr. .3	Poor	Poor	No Change	5511	
	Deep Cr. .3	Fair	Fair	No Change	5312	
	S.F. Malheur River 2.6	Poor	Poor	No Change	5206,5205	
	Riddle Cr. 1.4	Fair-Good	Fair-Good	No Change	5309	
	Stinkingwater Cr. .3	Excellent	Excellent	No Change	5532	
	Stinkingwater Cr. 2.6	Poor-Fair	Poor-Fair	No Change	5529,5531, 5532	
	Warm Springs Cr. .3	Poor	Poor	No Change	5530	
	Cottonwood Res. 85 acres	Poor-Fair	Poor-Fair	No Change	5522	Continued poor-fair condition is the result of fluctuating water levels. Grazing along the shoreline has little impact on the fish fish habitat. Improved watersheds may decrease siltation.
	Warm Springs Res. 4,420 acres	Poor-Fair	Poor-Fair	No Change	5530,5538, 5566	
RANGE IMPROVEMENTS						
17 miles fence 1 mile pipeline 6 spring dev. 13 reservoirs	18 Stream miles	Poor-Good	Fair-Excel	+++Long Term	5105,5307, 5309,5310, 5511,5522, 5529,5532, 5536	Once additional water is developed, fences would be built to decrease or eliminate livestock use along 10 streams. Some impacts as discussed above in forage allocation.

SUMMARY

Great improvement would occur on 22 public stream miles where grazing would be decreased or eliminated. Concentrations of livestock each year along 10 miles of public streams would result in continued poor/fair condition. Two reservoirs would remain in poor/fair condition due to fluctuating water levels.

1/ +++ Greatly beneficial, ++ Moderately beneficial, + Slightly beneficial, - Slightly adverse, -- Moderately adverse, --- Greatly adverse

2/ Habitat was surveyed during 1974-76 (USDI, BLM 1976) Table 2-10; stream inventory methodology and condition classes are explained in Appendix B7.

shoreline has little impact on the fish in these lakes. Decreased sediments from improved watersheds may improve fish habitat slightly.

3.4.9.3 Range Improvements

Fences, pipelines, spring developments and reservoirs would facilitate livestock exclusion and restricted use. Once reservoirs are developed in Allotments 5511 and 5105, proposed fences would be built to decrease use of riparian vegetation along Rattlesnake Creek, Bluebucket Creek and Middle Fork Malheur River. The well and pipeline in Allotment 5310 would provide new sources of water and permit fish habitat along Paul Creek to be fenced.

3.4.9.4 Conclusion

Impacts to fish and fish habitat are summarized in Table 3-9, Fish. All streams would improve slightly because of decreased runoff and sediment from improved watershed conditions. Slight increases in fish production are expected on 22 miles of public streams which would improve one condition class due to greatly reduced or eliminated cattle use. Heavy cattle use along remaining 10 public stream miles would result in static or decreasing populations.

3.5 IMPACTS ON RECREATION

3.5.1 Forage Allocation and Grazing Systems

Increases in big game population due to reduced forage competition between livestock and big game would enhance hunting and wildlife observation opportunities. While hunting seasons and limits are subject to variation, it is expected that some increase in deer hunting would occur. Improved fish habitat (Table 3-9) would enhance fishing opportunities.

Expected increases in the amount of persistent ground cover would make rock and mineral collecting more difficult if less rock and soil surface were visible.

3.5.2 Range Improvements

Range improvement projects would result in both beneficial and adverse impacts to recreationists. Effects on sightseeing are related to the impacts on visual resources (see Section 3.7). That section concludes that the foreground of certain Visual Resource Management (VRM) Class III areas would be temporarily disturbed by seeding and reservoir construction, even though design features would minimize contrasts.

Fencing would not significantly reduce four-wheel drive and motorcycle use since these activities are generally limited to roads within the ES area. However, fences would impede access for some recreationists, such as snowmobilers, hikers, hunters, horseback riders, and rock hounds. As a result, long-term impact would be more one of annoyances to recreationists that would cause recreational use in these activities to decrease slightly. While fences would increase hazards to snowmobilers, a sizeable increase in accidents is not expected because demand is low and the period of snowmobile use is short in the ES area (Section 2.9.1.3). Elsewhere, fencing along streams would help stabilize streambanks and improve fishing.

Water developments would slightly increase the area's recreational value and recreational use. The attraction of wildlife to water developments would enhance hunting and sightseeing opportunities.

Improved water quality resulting from less livestock use along streams would enhance fishing and water-based recreation opportunities. It is doubtful, however, that angler days would increase greatly because of low demand. Table 3-10 summarizes impacts to specific recreational activities.

3.5.3 Conclusion

Recreational use for snowmobiling, hiking, horseback riding, and collecting would decrease slightly. However, hunting, wildlife sightseeing, fishing, and other water-based recreation use would increase slightly. Changes in total recreational use in the Drewsey ES area would be inconsequential. Cumulative long-term impacts of the proposed action would be slightly beneficial. Recreation management opportunities would be subject to beneficial and adverse impacts as a result of range improvement. Table 3-11 summarizes these impacts.

3.6 IMPACTS ON CULTURAL RESOURCES

Livestock grazing and range improvement projects have the potential to cause adverse impacts to paleontologic, archeologic and historic sites. Design restraints and review and protection procedures as described in Section 1.2.2.2 would be fully complied with to minimize inadvertent adverse impacts to cultural resources from range improvement projects. Because known cultural resources would be protected, this analysis deals primarily with the effects of the proposal on unidentified sites. Any disturbance of cultural sites is permanent and irreparable and constitutes adverse impacts.

Trampling and livestock rubbing could adversely affect cultural resources by disturbing horizontal or vertical deposits, breaking or chipping artifacts, and contaminating data sources (Roney 1977).

Disturbance of archeologic sites from livestock trampling would be most significant within one-quarter mile of stock trails, fencelines, watering

Table 3-10

Summary of Impacts to Specific Recreational Activities

Activity	Element of Proposed Action Creating Impact	Location	Resulting Estimated Change in Projected Visitor Use (Worst-Case)
General sightseeing	Forage allocation and Grazing systems; Seeding and reservoir construction	Area-wide	Slight decrease
Snowmobiling, hiking, hunting, horseback riding, rock and mineral collecting	Fencing	Area-wide1/,2/	Slight decrease
Hunting, wildlife sightseeing	Forage allocation; Water developments; Grazing systems	Area-wide3/	Slight-moderate increase in visitor days (wildlife sightseeing data not available)
Fishing, water-based recreation	Forage allocation; Grazing systems; Water developments	Area-wide4/	Slight increase

1/ About 11 miles of fence would be erected in rock and mineral collecting areas. Quantification of fence mileage by allotment follows: 5514 (.5 mile), 5515 (1 mile), 5521 (1.5 mile), 5525 (2 miles), 5529 (1.3 miles), 5530 (2 miles), 5538 (3 miles).

2/ About 20 miles of fence are proposed in snowmobile use areas. Quantification of fence mileage by allotment follows: 5105 (3 miles), 5108 (2 miles), 5307 (2 miles), 5315 (1 mile), 5506 (2 miles), 5521 (2 miles), 5525 (2 miles), 5536 (5 miles), 5538 (1 mile).

3/ Sixteen reservoirs, nine spring developments, and two wells are proposed within popular zoological sightseeing areas. Quantification by allotment follows: 5101 (1 reservoir), 5103 (1 spring development), 5104 (1 reservoir), 5105 (10 reservoirs, 4 spring developments), 5108 (1 spring development), 5303 (2 wells), 5307 (1 reservoir), 5501 (1 reservoir), 5502 (1 reservoir, 3 spring developments), 5532 (1 reservoir).

4/ Table 3-9, Summary of Impacts to Wildlife--Fish, concludes that fish habitat would be slightly improved on 22 public stream miles in Allotments 5105, 5307, 5309, 5310, 5511, 5522, 5529, 5530, 5532, 5536.

Table 3-11

Summary of Impacts to Recreation Management Opportunity Areas

Location	Activity Potential	Summary of Improvement Projects	Type of Impact 1/	Degree of Impact
All creeks	Water-based recreation	Fencing	a	Slightly beneficial
South Fork Malheur River	Water-based recreation, hunter access	15 reservoirs, 1 spring development, 3.5 miles of fence	a,b,c	Minimally beneficial and adverse
Warm Springs Reservoir	Water-based recreation, ORV, snowmobile use	2 reservoirs, 5 spring developments	c	Minimally beneficial
Burnt Flat	Hunter access	1 reservoir	c	Slightly beneficial
Riddle Mountain	Hunter access	2 miles of fence, 2 reservoirs	a,b,c	Minimally beneficial & adverse
Beaver-Tables	Hunter access	4 reservoirs, 4.5 miles fence	a,b,c	Minimally beneficial & adverse
Drewsey-Tables	Hunter access	Numerous improvement projects proposed (including 27 miles of fence)	a,b,c	Minimally beneficial & adverse
Muddy Creek	Hunter access	3 reservoirs, 1 spring development	c	Slightly beneficial
Stinkingwater-Otis	Hunter access	Numerous improvement projects proposed	a,b,c	Minimally beneficial & adverse
South of Malheur Forest	Hunter access	32 reservoirs, 10 spring developments, 9 miles of fence	a,b,c	Minimally adverse moderately beneficial
Anderson Valley	Hunter access	1 reservoir, 1/2 mile fence	a,b,c	Minimally beneficial & adverse
South of Highway 20	Recreational access	Numerous improvement projects proposed	a,b,c	Minimally beneficial & adverse

1/ Type of impacts are keyed as follows:
a. Fencing would provide for bank stabilization, improved fish habitat, and enhanced fishing opportunities.
b. Fencing would restrict access.
c. Water developments would enhance sightseeing and hunting opportunities.

areas, and salt sources. Impacts of trampling would also be significant on hard, rocky surfaces and on sedimentary soils susceptible to erosion.

In general, historic roads and trails follow paths of least resistance. Livestock and wildlife would take the same course unless impeded by fences or other artificial obstructions. Locations are well documented in the literature although there is little remaining physical evidence. See Figure 2-12 for general locations. Site specific disturbance to physical remains would be significant in areas of livestock concentration. In terms of total resource values, impacts would be minimal due to the documentation.

3.6.1 Forage Allocation and Grazing Systems

Overall, initial forage allocation would result in less livestock use and less trampling of cultural resources. In the short term, those allotments most susceptible to trampling would be those with proposed upward forage allocation adjustments. After full implementation, livestock use would increase the possibility of cultural resources trampling.

According to Roney (1977), soil moisture affects the amount of artifact displacement. All grazing systems except deferred use include pasture use during spring (April 1 - May 1) when soil is wetter and subject to more compaction from trampling. Fall use may result in reduced vegetal cover before winter and perhaps greater susceptibility to trampling and erosion if grazed the following spring. In the the long term, increased vegetation would help to control erosion.

Known historical sites, including those sites on or eligible for nomination to the National Register, would not be significantly impacted by the proposed action.

Vandalism would be expected to increase if site locations became common knowledge as a result of intensive use. Loss of scientific information may reduce the potential to understand past use of the area.

3.6.2 Range Improvements

Some range improvement projects close to known historic sites would disturb the integrity of the setting. The interpretive, educational, recreational, and esthetic potential of these sites may slightly decrease. Potential for disturbance would be greater for those sites with high quality evaluations (see Table 2-12). Of the 11 historical sites rates "A" or "B", 2 sites (which are both trail routes) cross public lands. Construction of improvements in the vicinity of these trails could reduce the value of the historic setting. Impacts, if any, would be minor because of VRM constraints (see Section 1.2.2.2).

Range improvement projects may uncover sites that were not identified during project planning cultural resource surveys. Information may be gathered to add to the cultural resource data base. However, in the process of construction, all or part of the unidentified site may be inadvertently disturbed or destroyed. Once a site is identified, protection becomes a priority.

Surface disturbance at reservoir sites could severely disrupt unidentified sites at these locations. Impacts would consist of artifact breakage and disturbance of spatial relationships. In most cases, reservoirs would be located in intermittent drainages in areas far from perennial water sources. The probability of sites being in those vicinities is low.

Surface and subsurface cultural deposits could be damaged by the construction of pipelines. Increased traffic along fences could lead to increased trampling, erosion, and vandalism.

Spring developments could severely disturb or destroy any site associated with the spring. Watering troughs would concentrate cattle, accelerating impacts of trampling.

The surface of 32,782 acres would be disturbed by rangeland drills and vehicles during seeding. Brush beating would disturb as much as 10,859 acres.

3.6.3 Conclusion

Known paleontologic, archeologic, and historic sites would not be significantly affected by the proposed action. Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities. Unidentified archeological sites would be susceptible to artifact breakage, chipping, displacement and contamination. Once a site is found, however, protection procedures would be fully complied with to minimize damage to cultural resources.

The integrity of historic site settings could be slightly degraded in some cases if range improvement projects decrease interpretive, recreational, educational, and esthetic potential of nearby sites.

3.7 IMPACTS ON VISUAL RESOURCES

3.7.1 Forage Allocation and Grazing Systems

Initial forage allocation would decrease livestock use and would generally reduce impacts to visual resources associated with erosion due to trampling and grazing of vegetation. Furthermore, allocations to watershed would enhance visual resources. Some allotments with proposed upward adjustments initially may appear more closely grazed and may experience some adverse impacts to visual resources. This short-term impact may be most apparent in

Allotments 5303, 5304, 5316, and 5502. In the long term, increased amount of perennial ground cover would be beneficial to visual resources, even though the projected forage allocation after full implementation would be an increase of 22,606 AUMs.

Grazing systems would provide contrast between grazed and rested pastures. Impacts would be minimal however, as the implementation of VRM program procedures and constraints would allow for compatability with the various VRM classes.

3.7.2 Range Improvements

Major range improvements were analyzed in accordance with the BLM Visual Resource Management (VRM) system. Each improvement was examined to determine the degree of contrast it would create to the typical landscape of the Drewsey ES area. BLM manual 6310, Visual Resources, delineates methodology for the determination of VRM classes, contrast ratings for range developments, and impacts to visual resources. Table 3-12 summarizes the results of this analysis.

No impacts are anticipated to VRM Class IV areas as a result of range improvement projects. Reservoirs, wells (including tanks and troughs), seedings, and cattle guards would exceed the maximum visual impact allowable in the foreground of VRM Class III areas. Fencelines along ridgetops would be outlined and highly visible, increasing visual contrast. In this case, fences could create adverse impacts from the foreground of some VRM Class III areas. Table 3-12 further shows that much of the proposed project work has the potential to create minor adverse impacts to visual resources in the foreground and middleground of VRM Class II areas.

A site-by-site analysis determined the areas in which negative visual impacts would occur. Approximately 10,760 acres of VRM Class III lands would be subject to seeding. Allotments affected would be 5101 (1,000 acres), 5105 (160 acres), 5302 (6,400 acres), 5303 (1,300 acres), and 5304 (1,900 acres). Of this, about 7,400 acres would be subjected to brush control. In all cases, these projects would be within 3-5 miles of travel routes or sensitive areas. Short-term vegetative manipulation would be seen from the foreground in most cases. Six reservoirs are proposed in the foreground-middleground distance zone of Class III lands, resulting in land surface contrasts. The six reservoirs are proposed within the following allotments: 5101 (3), 5104 (1), 5105 (1), and 5501 (1). No impacts are anticipated on VRM Class II or IV lands.

Water developments would attract wildlife and provide additional opportunities to view wildlife. Scenic quality would be enhanced by the presence of water.

Seedings can further rehabilitate areas denuded by erosion, fire, or other forces. In the long term, seedings would improve scenic quality by introducing form, line, color and/or texture into the landscape.

Table 3-12

Potential Impacts of Range Improvement Projects to Visual Resources

	VRM CLASSES								
	II			III			IV		
	FG	MG	BG	FG	MG	BG	FG	MG	BG
FENCES									
Land/Water Surface	0	0	0	0	0	0	0	0	0
Vegetation	X	0	0	0	0	0	0	0	0
Structures	X	0	0	0	0	0	0	0	0
RESERVOIRS									
Land/Water Surface	X	X	0	X	0	0	0	0	0
Vegetation	X	0	0	0	0	0	0	0	0
Structures	0	0	0	0	0	0	0	0	0
WELLS (includes tanks, troughs, & structures)									
Land/Water Surface	0	0	0	0	0	0	0	0	0
Vegetation	X	0	0	0	0	0	0	0	0
Structures	X	X	0	X	0	0	0	0	0
SPRINGS									
Land/Water Surface	0	0	0	0	0	0	0	0	0
Vegetation	X	0	0	0	0	0	0	0	0
Structures	0	0	0	0	0	0	0	0	0
PIPELINES									
Land/Water Surface	0	0	0	0	0	0	0	0	0
Vegetation	0	0	0	0	0	0	0	0	0
Structures	0	0	0	0	0	0	0	0	0
SEEDING									
Land/Water Short-term	X	X	0	0	0	0	0	0	0
Surface Long-Term	X	0	0	0	0	0	0	0	0
Vegetation Short-term	X	X	0	X	0	0	0	0	0
Long-Term	X	X	0	0	0	0	0	0	0
Structures	0	0	0	0	0	0	0	0	0
CATTLE GUARDS									
Land/Water Surface	0	0	0	0	0	0	0	0	0
Vegetation	X	X	0	X	0	0	0	0	0
Structures	X	X	0	X	0	0	0	0	0

Note: FG = foreground; MG = middleground; BG = background. 0 = no impact; X = adverse impact. Therefore, according to the table, a reservoir would create a negative impact (X) to land surface in a Class III area when it could be seen from the foreground, but it would create little or no impact (0) when it could be seen only from the middleground or background, etc.

3.7.3 Conclusions

Overall impacts to visual resources would be minimal. Unesthetic results of range improvements would be temporary until vegetation is reestablished. Design features would minimize landform and vegetative contrast changes. Over the long term, esthetics would improve as range condition improves.

3.8 IMPACTS ON WILDERNESS VALUES

Although no area-wide wilderness inventory has been conducted to date, certain areas have been previously identified as possessing roadless or primitive area characteristics (see Section 2.12). Some of these areas may be considered in the future for potential wilderness designation. Primitive values in the Blue Bucket Creek-Malheur River and Squaw Lake areas would be protected pending completion of the wilderness review mandated by FLPMA of 1976.

Bureau policy requires deferral of actions that would impair an area's suitability for wilderness preservation in any roadless area of 5,000 or more acres until the area is removed from consideration for wilderness designation. Wilderness Study Areas within the Drewsey ES area will be identified by late 1980. Protection of these areas will continue pending completion of the wilderness suitability studies so no adverse impacts to areas identified as wilderness study areas would occur.

The impacts of forage allocation and livestock grazing systems to areas with wilderness values would be minimal.

The impacts of range improvement projects to areas with wilderness values would be minimal. Certain range improvements would be allowed within areas with wilderness values as long as the projects would not impair the area's wilderness suitability. Environmental assessments will deal with this level of analysis for specific areas.

When it is determined that an area does not meet the criteria for a wilderness study area, or Congress declares a wilderness study area unsuitable for wilderness designation, other multiple-use activities can proceed without the constraint of preserving wilderness values.

3.9 IMPACTS ON LAND USE

3.9.1 Livestock Grazing

3.9.1.1 Forage Allocation

Upon implementation of the proposed action, grazing use on public lands would initially be reduced from the 1976 use of 76,348 AUMs to the proposed

use of 67,906 AUMs. In the short term this is a net loss of 8,442 AUMs, or 11 percent, which would have an adverse effect on livestock grazing for the first few years. Impacts to individual operators are discussed in Section 3.10 Economics.

Over the long term, after full implementation of the proposed action, livestock grazing would be increased to 84,647 AUMs, an increase of 7,749 AUMs or 9 percent above the 1976 use.

3.9.1.2 Grazing Systems

Grazing systems proposed in the AMPs would entail moving livestock more often than under present management and in some cases longer distances. The proposed grazing systems would concentrate livestock in smaller pastures. This would result in better overall utilization of the grazed pastures. When specific objectives of the proposed AMPs are met, forage conditions in the area would improve as indicated by the partially implemented AMPs that exist in the area. Overall, the concentration of livestock into use pastures would be a long-term beneficial impact on livestock grazing as a result of increased forage available for livestock.

A general increase in livestock production would occur in conjunction with livestock quality and good livestock management practices. See Table 3-14 for estimated changes in livestock production. No significant change in calf crop, weaning weights, or death loss is expected in the Drewsey ES area because changes in these factors are more related to husbandry and general management practices than to the type of grazing system.

Trespass would decrease due to an increase in monitoring and supervision. Improved forage production would have a long-term beneficial impact on livestock grazing in the ES area.

3.9.1.3 Range Improvements

The seedings would produce additional forage and the water developments would provide for a more even utilization of the forage. Fencing would provide for livestock control to achieve the required rest on deferred grazing treatments.

3.9.1.4 Conclusion

The short-term adverse impact of the proposed action to livestock grazing would be an initial reduction in AUMs. In the long term, increased forage production and improved management would result in increased livestock grazing and livestock production. For livestock grazing, in spite of some individual and short-term adverse impacts, the overall net impact of the proposal would be beneficial, resulting in 7,749 additional AUMs of forage for livestock use.

3.9.2 Wild Horses

3.9.2.1 Forage Allocation

The proposed action provides for initial and projected forage allocations of 3,960 AUMs for a maximum of 330 wild horses as shown in Table 3-13.

Table 3-13

Wild Horse Herd Management Areas

Herd Management Area	Number of Horses Counted in 1976	Herd Management Plan Numbers 1/ Min No.	Max. No.
Middle Fork	36	30	50
Stinkingwater	144	40	80
Riddle Mountain	87	80	120
Smyth Creek	38	30	50
East Kiger	34	20	30
Craters	19	0	0
Total	358	200	330

1/ These herds are expected to remain viable at minimum numbers. The Craters Herd Management Area is being eliminated due to MFP decision. See the individual Wild Horse Herd Management Plans at the Burns District Office for additional information.

The proposed forage allocation would decrease the forage competition between horses and livestock that presently exists in the ES area.

3.9.2.2 Grazing Systems

No studies of the impacts to wild, free-roaming horses from livestock grazing systems have been found. However, it could reasonably be expected that the proposed grazing management would bring about increased disturbance to the horses by livestock operators being in the area more often, inspecting and moving their livestock in compliance with the proposed grazing systems. Pastures in the rest phase of grazing systems would be available for grazing by horses.

3.9.2.3 Range Improvements

The design, construction and maintenance of range improvements would result in more people being in the wild horse areas, thus disturbing the wild horses with increased activity and noise, for a short-term minor adverse impact.

Since none of the three proposed fences in the wild horse herd areas (6.5 miles total) are in areas where horses congregate, no impacts to horses from those fences are expected. Horses also do not concentrate on the pasture in Allotment 5313 where 6 miles of pipeline are proposed. The 38 reservoirs and 29 proposed springs are expected to cause the wild horse bands to become more dispersed. Areas of forage previously unavailable to horses because of long distances from water would become open to their grazing. For location for these range improvements, see Figure 1-1 and compare with Figure 2-14, Wild Horse Herd Management Areas.

3.9.2.4 Conclusion

The proposed action would cause some minor disturbance to wild horses from construction of range improvements. Minor beneficial impacts would occur from additional water supplies and related opening up of additional range in formerly ungrazed areas plus provision of an assured amount of forage for the mnaximum number of 330 horses.

3.9.3 Ecologically Significant Areas

No severe impacts would occur to the Diamond Craters areas which is proposed for outstanding natural area status. As a result of range improvement project construction in proximity to ecologically significant areas, increased visitation to these areas may occur. A slight increase in vandalism and area degradation would be an indirect impact to these areas.

Of those areas identified as being ecologically significant by the Oregon Natural Heritage Program, the plateau above Devine Canyon and Stinkingwater Mountains would be susceptible to impacts of range improvement projects. A reservoir to be constructed just east of Devine Canyon would cause surface disturbance, destruction of vegetation, and soil compaction. *Ivesia baileyi*, a plant species of undetermined status listed on the Provisional List of Rare, Threatened and Endangered Plants in Oregon (Table 2-7), is known to occur in rocky areas of Devine Canyon and may occur in the plateau area where the reservoir is to be constructed. Within the Stinkingwater Mountain area identified as being ecologically significant, there are 31 reservoirs, 8 spring developments, 1 well, and about 5,000 acres of seeding proposed. High quality western juniper woodland habitat could be temporarily disturbed on 33 acres and permanently disturbed on 16 acres. Proposed vegetation management and livestock use reductions would improve antelope range and slightly increase winter forage (see Section 3.4.3 and Table 3-9). Known paleontologic features would not be disturbed.

The ecological values of these two areas which caused them to be recognized by the Nature Conservancy (1978) could be degraded by the proposed action.

Project design features and program constraints would serve to greatly mitigate any adverse impacts to these areas.

3.10 IMPACTS ON ECONOMIC CONDITIONS

Although the proposed action may have some significant economic impacts on individuals throughout Harney County, there would be only minor effects on the community. No discernible economic influence on hunting and general recreation income and employment would be expected.

3.10.1 Livestock-Related Income

The proposal would initially allocate approximately 10 percent less forage to livestock than in 1976. However, after full implementation, the forage allocation would support about 10 percent more livestock than in 1976.

Table 3-14 displays livestock revenues per AUM and average revenue per animal unit that correspond with recent and projected livestock forage and market conditions. Livestock permittees who would lose grazing privileges on public lands can use this information to estimate their individual income effects.

3.10.1.1 Impact on Permittees

As shown in Table 3-15, the initial livestock allocation would result in a loss of AUMs for about 60 percent of the permittees who had grazing permits in the Drewsey ES area in 1976. For 19 permittees the reductions would exceed 5 percent of their total annual forage requirements. Of these, nine permittees would experience a decrease in forage of at least 10 percent of their past forage requirements. One permittee would lose 22 percent. Those permittees whose reductions would be less than 5 percent of past forage requirements would generally be expected to experience insignificant economic impacts.

Although this dependency analysis shows no correlation between any particular size of operation and the extent of impacts, seven of the permittees who would lose at least 5 percent of their annual livestock forage requirements reported less than 300 animal units in 1976. Based on the findings of Bostwick et al. (1975), it is expected that these permittees probably already supplement their incomes with non-livestock related income.

The type and degree of impact would depend on the permittee's response. It is believed that three management options would be available: adjust to the reduction; lease or purchase other grazing lands; or feed purchased hay. Table 3-16 displays the expected economic impacts per AUM.

With the first option, the affected permittee would sustain a loss in potential profit that could be expressed as either (1) the sum of lost livestock

Table 3-14

Estimated Livestock Sales and Returns to Ownership

	1974-76 Average Use 1976 Avg. Market Prices	1977 Use 1977 Avg. Market Prices	1978 Use 7/15/78 Market Prices	Proposed Initial Livestock Use 7/15/78 Market Prices	Proposed Initial Livestock Use 1976 Avg. Market Prices
AUM Use Permitted (BLM)	76,348	64,550	65,753	67,906	67,906
Equivalent Total Herd Size Animal Units (AU)1/	6,362	5,379	5,479	5,659	5,659
Price Per Pound2/	$ .32	$ .35	$ .53	$ .53	$ .32
Calf Sales3/	$409,200	$378,400	$583,700	$602,900	$364,000
Price Per Pound2/	$ .25	$ .24	$ .36	$ .36	$ .25
Cull Cow Sales4/	$167,000	$135,600	$207,100	$213,900	$148,500
Price Per Pound	$ .33	$ .33	$ .47	$ .47	$ .33
Bull Sales5/	$ 25,200	$ 21,300	$ 30,900	$ 31,900	$ 22,400
Total Sales	$601,400	$535,300	$821,700	$848,700	$534,900
Average Livestock Revenues Per Animal Unit(AU)	$ 94.53	$ 99.50	$ 149.96	$ 149.99	$ 94.53
Average Revenues per AUM	$ 7.87	$ 8.29	$ 12.50	$ 12.50	$ 7.87

1/ One annual unit (AU) is considered to be one mature (1,000 lb.) cow or the equivalent based upon the average daily consumption of 26 lbs. of dry matter per day.
2/ Livestock prices are taken from USDA. Economics, Statistics, and Cooperatives Service, Crop Reporting Board, Agricultural Prices, July 31, 1978, Washington DC.
3/ Calf crop equals 75 percent of herd size, number of calves marketed equals 60 percent of herd size equivalent, average calf weight equals 335 pouunds when marketed.
4/ Cull cows marketed equal 12 percent of herd size, average cull cow weight equals 875 pounds when marketed.
5/ Bulls marketed equal .01 percent of herd size, average bull weight equals 1,200 pounds when marketed.

Table 3-15

Extent of Impact Among Permittees

	At Initial Implementation	At Full Implementation
Total Number of Permittees	82	
Number of permittees that would lose BLM AUMs from base (1976) level	48	17
Change in livestock forage dependency, number of Permittees with:		
0 to 4.9 percent loss	29	15
5 to 9.9 percent loss	10	1
10 to 19.9 percent loss	8	1
greater than 20 percent loss	1	

earnings, e.g. average earnings per AUM ($5.65) multiplied by the number of livestock AUMs lost, or (2) the sum of lost livestock revenues minus the sum of livestock production costs avoided. The first method utilizes the 6-year estimated average earnings per livestock AUM in Harney County (Table 2-19). Estimated minimum costs, in terms of lost earnings for all permittees in the ES area, would be about $48,000 when livestock AUMs are reduced from the 1976 level (76,348) to the proposed initial allocation (67,906). The second method reflects the loss of estimated average revenues per AUM at various market conditions (Table 3-14). This allows ranchers with various costs per animal unit (AU) or AUM to determine their individual total costs.

Table 3-16

Expected Economic Impact Based on Permittee Response

Permittee Response	Additional Cost per AUM	Receipts per AUM	Net Receipts per AUM
Adjust to reduction	5.65 1/	0	-5.65
Lease/purchase pasture	5.30	5.65	.35
Feed hay	16.50	5.65	-10.85

1/ Cost per AUM expressed in terms of lost receipts

A second option would be to purchase or lease alternative AUMs. Since the average March 1978 commercial value of an AUM in Oregon was $5.30 (USDA, Economics, Statistics, and Cooperatives Service, July 1978), total estimated costs to permittees would amount to about $45,000.

The third option would be to feed hay or other forage to the livestock instead of grazing on public lands. Assuming 0.3 tons of alfalfa hay has the feed equivalent of one AUM, this option would cost an average of $16.50 per AUM or a total of about $139,000. (The average price received for alfalfa hay in Oregon on August 15, 1978, was $55.00 per ton.)

Impacts of Initial Allocation of AUMs

Specific impacts of reducing AUMs are difficult to project or quantify. There would be a wide variety of impacts among individual permittees. Impacts would depend on the individual's adaptability, income, equity, dependence on Federal range, and particular type of livestock enterprise. Consequently, individual permittee responses may range from reducing herd size to selling or leasing ranches.

The demand for grazing on adjacent private, State, or other Federal land would increase and probably exceed supply. If so, the price of local commercial grazing fees would also increase. Economic theory suggests that individual operators would demand alternative grazing until the price per AUM exceeds the marginal revenue per AUM. While values on surrounding private land would increase, the base properties that had grazing reductions may decline in relative value because of their reduced earning potential.

The ranchers' abilities to borrow operating capital from agricultural lending institutions would also be adversely affected since the Federal qualifications on public lands are used to determine the repayment capacity of ranchers. Since BLM forage is recognized as an important source of feed when other sources are either unavailable or obviously less profitable, the value of base property would fluctuate with changes in the amount of livestock grazing on public lands.

The demographic characterisitics of the local ranchers suggest that some of those affected would probably accept retirement and/or part-time seasonal employment. Some might also supplement their incomes by selling or leasing sections of their ranches. The percent of those self-employed in agriculture would decline slightly as they join the wage and salary employees on a full-time or part-time basis. A few others who wish to continue their ranch operations would probably join the 20 percent within the county who already work away from their ranches more than 200 days per year. Females who had previously worked on the ranch in family operations would probably seek non-farm employment.

In the worst case situation, it is not expected that more than one or two permittees would cease ranching entirely.

Although livestock forage would be increased by over 1,000 AUMs in certain allotments, allocation of this forage among permittees has not been

determined. Adverse economic impacts to ranchers who lose AUMs could be lessened if this forage were allocated to them. However, the relative distances of these allotments from base properties and corresponding transportation costs could be prohibitive. Alternatively, this forage could be allocated to other ranchers who would not lose AUMs, thereby increasing their authorized use and potential profits.

The income impacts would be unequal among the permittees. Those ranchers with the greatest change in dependency on BLM forage would be affected the most.

Impacts of AUM Allocation at Full Implementation

Specific impacts of full implementation are related to changes in AUMs for individual permittees. It is expected that 17 permittees would still have fewer BLM AUMs than they had in 1976. One permittee would sustain losses of at least 5 percent or more of 1976 forage consumption and another permittee would sustain a loss of 11 percent. Alternatively, of those 48 permittees who initially lost AUMs, at least 16 would probably experience eventual increases over their 1976 level and 15 others would probably return to their 1976 levels. Based on present allocations, as many as six permittees who would not be affected initially could gain AUMs upon full implementation. The uncertainty results from the fact that the distribution of gains has not been determined.

After full implementation, total livestock receipts and earnings derived from livestock use on public lands in the ES area would exceed both the 1976 and 1978 levels. With average livestock earnings of $5.65 per AUM, estimated direct earnings from 84,097 AUMs would be $475,100. This is $43,700 (10 percent) more than in 1976. These earnings would amount to 10 percent of the 1971 to 1976 average annual total agricultural earnings in Harney County. Although the longer-term impact on permittees could be significant, the general impact on the community, even to county agricultural earnings, would probably be insignificant.

Total (direct plus indirect) income generated by livestock grazing on public lands would be $622,400 compared to $565,000 in 1976.

3.10.2 Contract Construction - Related Income

The proposal would cost an estimated $1,835,000 over a 10-year period. Estimated annual maintenance costs would be $122,000. The magnitude and significance of these expenditures to the local economy depends on the amount of work done by local contractors and residents.

Total construction costs (gross receipts to industry) can be converted to local earning impacts with an earning-output coefficient (.5898 as reported

by the Water Resources Council 1977, Guideline 5, U.S. Department of Commerce 1977). Nearly 60 percent of the construction costs would be retained as earnings by households within Harney County. This would supplement the county's 1974 annual earnings from contract construction by an average of $110,000. Although this would be about a 25 percent increase over 1974 contract construction income, the total county personal income would increase by less than 1 percent.

3.10.3 Employment

The proposal would cause minor changes in employment in the agricultural and construction sectors. The 1976 livestock employment supported by grazing on public lands within the ES area was an estimated full-time equivalent of 38 jobs. The proposed action would initially support the full-time equivalent of 33 jobs and after full implementation would support 41 jobs ($84,097 AUMs X $5.65 = $475,100 ÷ $11,500 (1974 average earnings, etc.) = 41 jobs). However, the actual number of people employed in the livestock industry would probably remain somewhat constant. Initial changes would occur in terms of full-time employees changing to part-time employee or fully employed individuals/permittees would become underemployed. The reverse would occur as BLM AUMs are increased after full implementation of the proposal. Only minor increases in livestock employment would occur as herd sizes are gradually increased. Permittees would experience some economies of scale and could probably handle the bulk of the additional labor requirements with their existing work force which, to a large extent, is composed of family members.

Based on the additional construction earnings, average annual employment increases within the construction sector during the 10-year construction period would be the equivalent of less than five full-time employees.

Total changes in employment as a result of the proposal would be insignificant.

3.10.4 Conclusion

Initially, about 10 percent of the permittees would have a significant change in livestock forage dependency. This would result in the loss of about $48,000 in direct earnings from livestock production and the full-time equivalent of five jobs. After full implementation, one permittee would be significantly less dependent on BLM forage. Direct earnings would be about $44,000 more than in 1976 and the full-time equivalent employment would be about three more than in 1976. The impacts on individuals would depend on the permittee's adaptability and, to some extent, the response of other operators.

3.11 IMPACTS ON SOCIAL CONDITIONS

The determination of social impacts is based on interview responses to open-ended questions asked in a non-random survey (Centaur Associates 1978) and the review of secondary social data.

The social impacts on individual permittees are related to the permittee's dependency on BLM livestock forage and the permittee's adaptability to economic impacts. The less the permittee's dependency on BLM livestock forage changes, the less significant would be the impacts of the proposal. Ranchers who are better able to adjust to the proposed changes would also experience less severe social impacts. As the number of permittees using BLM livestock AUMs decreases, either dependently or independently of the proposed action, the impacts would probably become less severe on the remaining individuals. For example, if one permittee with 30 percent of an allotment's livestock AUMs retires, other permittees may be able to avoid or minimize adverse impacts--e.g., decline in income, the necessity to acquire supplemental income, or a resulting decline in individual or family welfare--by acquiring the retiree's private land and/or public grazing permit. Consequently, although the impacts on certain individuals may be significant, measurable impacts among permittees would probably not be widespread.

Locally, the proposed change in BLM livestock grazing would be seen as yet another instance of decisionmaking by distant authorities who fail to understand the effects on local residents. Impacts would likely include intensification of negative attitudes toward "big government," along with some efforts to gain agricultural aid to ranchers. This may take the form of lobbying activities through the Cattlemen's Association, or direct contact with elected representation. If dependent family ranchers are replaced by nonfamily corporate ranching enterprises, the political support tied to traditional ranching values would also probably change. The proposal may increase the rate of social change if permittees are unable to survive the initial reductions in livestock allocations.

Initial impacts on community relationships could involve shifts in family relations as sons and their families move away from ranches. If newcomers arrive, relationships between ranchers and other local users (e.g., hunters, hikers) would be affected although it is difficult to identify the status quo or to predict the precise nature of a possible shift.

Overall, the social impacts would be unquantifiable. To some extent, the proposal would initially contribute to an already existing alienation and frustration with government although the achievement of a projected increase in AUMs may restore some credibility in BLM actions. The perception of constrained local control over the community's future would persist and resentment may intensify among longtime residents. Changes in the character of the community would probably occur more rapidly and could affect community cohesion. The proposal may be credited with or blamed for causing change, even if these changes are inevitable.

CHAPTER 4

Mitigating Measures not included in the Proposed Action

4

4. MITIGATING MEASURES NOT INCLUDED IN THE PROPOSED ACTION

Mitigation of impacts identified in Chapter 3 have not been proposed beyond those levels included in the proposal and described in Section 1.2.2.2 as project design features.

5

CHAPTER 5

Adverse Impacts which cannot be Avoided

5. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

Chapter 5 presents an analysis of the unavoidable adverse impacts that would result from the proposed action.

Project design features discussed in Section 1.2.2.2 constitute best management practices, thus no additional mitigating measures are proposed. When the extent of a possible adverse impact was unknown, a worst case scenario was developed and resulting impacts are presented below. Possible failure of project design features was considered in the worst case analysis.

5.1 VEGETATION

The composition of desirable species would be reduced on 18,000 acres of public land including 70 acres of riparian vegetation. Undesirable species would be reduced on approximately 618,000 acres. A short-term reduction of vegetative ground cover would occur on 33,181 acres and a long-term loss of vegetative ground cover would occur on 127 acres. Threatened and endangered plant species not identified in surveys could be lost.

5.2 SOILS

The construction of range improvements would temporarily expose 33,181 acres to erosion. Streambanks on 32 miles of streams would continue to erode on allotments with deferred, continuous, deferred rotation, and rotation grazing systems. Livestock concentration around the proposed springs and reservoirs would expose 1,017 acres to erosion.

5.3 WATER

The construction of range improvements would result in a short-term increase in sediment yield of 14 acre-feet per year. The 230 proposed reservoirs would prevent 345 acre-feet per year of water from reaching downstream users. Total evaporative losses from the reservoirs would be 207 acre-feet per year.

5.4 WILDLIFE

Mule deer and antelope would be subject to increased forage competition on 30,000 acres due to livestock season of use and water developments.

Sage grouse would lose food and cover from sagebrush control on 2,884 acres. Additional loss of food would occur due to reduced meadow vegetation at developed springs.

Nongame wildlife would lose food and cover due to sagebrush control on 10,859 acres and reduced meadow vegetation at spring developments. Small birds and mammals would occasionally drown in water troughs.

Riparian habitat along 37 miles of stream would remain in poor condition for mule deer, antelope, sage grouse, valley quail and nongame wildlife. Ten miles of stream would remain in poor condition for fish.

5.5 RECREATION RESOURCES

Slight decreases in sightseeing are expected due to increased visual contrasts. Access restriction caused by fences is expected to cause slight reduction in visitor use for snowmobiling, hiking, horseback riding and rock collecting.

5.6 CULTURAL RESOURCES

Unidentified cultural sites would be susceptible to artifact breakage, chipping, displacement and contamination during construction of range improvements.

5.7 VISUAL RESOURCES

Visual quality would be slightly degraded on temporary basis by range improvements. Revegetation would reduce visual contrasts.

5.8 LAND USE

5.8.1 Livestock Grazing

The initial forage allocation would result in a loss of 8,442 AUMs.

5.8.2 Wild Horses

The construction of range improvements would temporarily disturb wild horses.

5.8.3 Ecologically Significant Areas

Some degradation of the ecological values in the Devine Canyon and Stinkingwater Mountains (East Slope) could occur.

5.9 SOCIOECONOMIC CONDITIONS

Initially about 10 percent of the operators would have a significant change in

livestock forage dependency. This would result in the loss of about $48,000 in direct earnings from livestock production and the full-time equivalent of 5 jobs. After full implementation, one permittee would need to supplement a significant loss of BLM forage. The impacts on individuals would depend on the operator's adaptability and, to some extent, the response of other operators.

CHAPTER 6

The Relationship Between Local Short-Term Uses of Man's Environment and Long-Term Enhancement of Productivity

6

6. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This chapter analyzes the trade-offs between short-term use and long-term productivity. For this purpose, the short term is 5 years, which is the period required to put the grazing management program into full operation. All scheduled activities would be in progress and physical range improvements would be in place. Long term would be 10 years after full implementation, by which time the objectives outlined in Chapter 1 would be achieved.

Grazing use during spring and early summer would decrease plant vigor, reproduction, seedling establishment, and litter accumulation in grazed pastures over the short term. Moderate use under the continuous grazing system, and periods of rest provided under the remaining grazing systems would, in the long term, act to increase plant vigor and percent composition of desirable plant species. This would result in an increase in persistent ground cover, which would lead to a decrease in erosion, sediment yield in streams, and runoff. The increased persistent cover would provide improved habitat for wildlife and improve range condition and productivity. More AUMs would be available for livestock, which would increase the income to operators and the local economy.

The construction of range improvements would result in increased erosion and sediment yield, contrast visually with landscape elements, and displace some animals over the short term. In the long term, the increased water supply would benefit wildlife and wild horses and help diminish concentrations of animals at existing water sources and riparian areas. As vegetation became reestablished on disturbed areas, erosion and sediment yield would decrease. Only 127 acres would be lost to vegetative production; seeding 21,923 acres presently bare of perennial species would increase the vegetative cover, reduce erosion and make additional forage available on those acres.

Construction of reservoirs would reduce the amount of water reaching downstream users in the short and long term, but not significantly.

The net effect on the environment over the long term from the proposed action would be an improvement in environmental quality and increased productivity of the various resources.

CHAPTER 7

Irreversible and Irretrievable Commitment of Resources

7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This chapter identifies the extent to which the proposed action would irreversibly limit the potential uses of the land and resources. The term irreversible means incapable of being returned to its original state. Irretrievable means a resource or value cannot be replaced.

The 127 acres which would be occupied by the range improvements would lose their capacity to produce vegetation for the life of the improvement. This is considered to be an irretrievable commitment of the vegetation resource. Disturbance of the soil surface during the construction of range improvements would cause an irretrievable loss of soil resulting in an increase in sediment yield in streams. Withdrawal of groundwater by the proposed wells would be irretrievable.

Proposed livestock grazing and range developments could disturb certain cultural resources. Once disturbed, historical and archeological sites, as well as artifacts, are no longer available for future study. This can result in a data gap in the history of an area and would be considered an irretrievable commitment.

Possible loss of ecologically significant areas would be irreversible. Threatened and endangered plant species not identified in surveys could also be lost.

An undetermined amount of energy would be irretrievably committed to install, operate, and maintain range developments.

CHAPTER 8

Alternatives

8

8. ALTERNATIVES

This chapter will discuss the following six alternatives to the proposed action previously outlined in Chapter 1:

1. Eliminate livestock grazing.

2. Protect sedimentary soils and optimize the wild horse population.

3. Adjust livestock grazing use.

4. Implement only cost-effective AMPs.

5. Optimize allocation of forage to livestock.

6. No action (Continuation of the present situation).

Table 8-1 presents a comparison of the components for each of the alternatives and the proposed action. Stocking rates would not exceed the forage carrying capacity except for Alternatives No. 5 and No. 6. Less intensive management (L.I.M.) allotments would not be affected except in Alternative No. 1 where all livestock grazing would be eliminated and in Alternative No. 2 where sedimentary soils are found in Allotments 5317, 5322, 5539, 5540, 5550 and 5557 (see Figure 1-1). Since the major actions of the proposal (consisting of forage allocation, grazing systems, and range improvements) would not apply to allotments proposed for less intensive management, they will not be discussed in this chapter except under Alternatives No. 1 and No. 2 as noted. Areas presently not allotted for livestock grazing would remain unallotted in each of the alternatives.

Analysis indicates that there would be no significant impacts upon climate, air quality, geology, topography, and threatened and endangered plants or animals. Since agriculture is closely associated with livestock grazing and economics, impacts on agriculture will be discussed in these sections.

Construction methods and design standards for the range improvements would be the same as described in Chapter 1. The 2,660 acres described in Table 1-8 for protection of riparian areas by fencing to exclude livestock grazing would be protected in all alternatives.

Only the significant impacts for each resource value affected by each alternative are analyzed. Where the impacts are the same as would occur under a previously discussed alternative, these impacts are referenced and are not repeated again. Long-term impacts of each alternative will be analyzed in the same time frame (15 years) as the proposed action.

Table 8-1

Comparison of Alternatives and Proposed Action

Components	Proposed Action		Alternatives: 1 Eliminate Livestock Grazing		2 Protect Sedimentary Soils & Optimize Wild Horses		3 Adjust Livestock Grazing Use		4 Implement Only Cost Effective AMPs		5 Optimize Livestock Forage		6 No Action	
Forage Allocation: (AUMs)	Init	Proj	Init	Proj	Init	Proj	Init	Proj	Init	Proj	Init	Proj	Init	Proj
Livestock	67,906	84,097	0	0	36,638	39,159	67,906	67,906	67,906	73,437	73,101	107,536	76,348	76,348
Wildlife	1,345	2,647	1,345	1,345	1,345	2,091	1,345	1,345	1,345	2,017	0	0	0	0
Wild Horses	3,960	3,960	3,960	3,960	26,585	26,585	3,960	3,960	3,960	3,960	360	360	0	0
Watershed	5,956	11,069	73,862	73,862	14,599	16,672	5,956	5,956	5,956	10,287	5,706	5,706	0	0
Carrying Capacity	79,167	101,773	79,167	79,167	79,167	84,507	79,167	79,167	79,167	89,695	79,167	113,602	79,167	79,167
Grazing Systems: (Acres)														
Continuous	82,588		0		29,588		179,217		153,479		82,588		179,217	
Deferred	94,300		0		37,173		96,592		84,573		94,300		96,592	
Rotation	50,751		0		32,402		43,785		48,247		50,751		43,785	
Deferred Rotation	238,659		0		123,425		188,113		214,964		238,659		188,113	
Rest Rotation	144,418		0		96,162		110,796		114,758		144,418		110,796	
Early	25,728		0		13,897		17,941		20,423		25,728		17,941	
TOTALS	636,444		0		332,647 2/		636,444		636,444		636,444		636,444	
Range Improvements:														
Reservoirs (each)	230		0		137		0		95		230		0	
Springs (each)	109		0		69		0		34		109		0	
Wells (each)	4		0		2		0		1		4		0	
Pipelines (miles)	53		0		43		0		16.5		53		0	
Fences (miles)	70.7		0		53.1		0		20.2		70.7		0	
Cattle guards (each)	24		0		10		0		13		24		0	
Seeding (acres)	32,782		0		15,049		0		9,289		32,782		0	
Brush Control (acres)	10,859 1/		0		8,359 1/		0		800 1/		184,507 3/		0	

1/ Brush control areas would be seeded and are the same acres shown under seeding.
2/ The remaining 303,797 acres would not be grazed.
3/ 10,859 acres would be seeded and are included with the acres shown under seeding.

Impacts of the six alternatives are compared with the existing situation and summarized in Table 8-2. Table 8-3 compares all of the alternatives with the proposed action in relation to statewide goals of the Oregon Land Conservation and Development Commission (LCDC).

8.1 ELIMINATE LIVESTOCK GRAZING

ALTERNATIVE NO. 1

This alternative would eliminate all authorized livestock grazing except trailing use from the 677,709 acres of public lands in the ES area. Domestic livestock trailing permits would continue to be issued when necessary to allow livestock movement to or from private, State, and National Forest lands. Livestock forage allocated to wildlife (1,345 AUMs) and wild horses (3,960 AUMs) would be maintained at the same level as the proposed action. All forage remaining (73,862 AUMs) after these consumptive uses have been satisfied would be available for watershed protection or other nonconsumptive uses.

Timber, wildlife, minerals, soil, water, lands, and recreation resources would otherwise continue to be managed in accord with the Drewsey MFP decisions. Fencing to restrict livestock use as described in Table 1-4 would not be done in this alternative. Increased range supervision by BLM would be necessary to assure that operators adhere to conditions of trailing permits and that trespass does not occur.

To achieve complete elimination of livestock grazing on public lands, an undetermined amount of fencing would be required to fence private and State lands. This would result in additional cost to all adjacent landowners.

None of the adverse or beneficial impacts related to the development of the range improvements or grazing systems in the proposed action would occur, therefore, they will not be discussed.

8.1.1 Vegetation

Initially, plant vigor, percent composition of desirable plants, seedling establishment and litter accumulation would increase. The most change would occur on the potential big sagebrush and riparian communities (about 416,000 acres as described on Table 2-4). These communities have the greatest capability for change in plant composition.

Elimination of grazing would cause fewer changes in the stiff sagebrush, greasewood, low sagebrush, and ponderosa pine communities. Because fewer of the plants in these communities are palatable to livestock, the vegetation is closer to the potential.

Table 8-2

Summary and Comparison of Impacts of the Proposed Action and the Alternatives to the Present Situation.

Significant Resource	Present Situation 1/	Proposed Action 2/	1 Eliminate Livestock Grazing	2 Protect Sedimentary Soils & Optimize Wild Horses	3 Adjust Livestock Grazing	4 Implement Only Cost Effective AMPs	5 Optimize Livestock Forage	6 No Action
Soils								
Erosion Condition	0	+3	+4	+2	+1	+2	+3	-1
Streambank Erosion	0	+2	+4	+3	0	+1	+2	0
Water								
Runoff	0	-1	-2	-1	0	-1	-1	0
Coliforms	0	+2	+4	+2	0	+1	+2	0
Sediment Yield (ac-ft/yr)	0	+3	+4	+2	+1	+2	+3	-1
Water Impounded (ac-ft)	0	+3 (345)	0 (0)	+2 (205)	0 (0)	+1 (142)	+3 (345)	0 (0)
Groundwater Withdrawn (ac-ft)	0	+4 (4)	0 (0)	+2 (2)	0 (0)	+1 (1)	+4 (4)	0 (0)
Vegetation								
Vegetative Ground Cover	0	+3	+5	+2	+1	+2	+3	-1
Forage Production (AUM)	79,167	101,773	79,167	79,167	79,167	89,695	113,602	79,167
Range Condition	0	+3	+5	+2	+1	+2	+4	-1
Wildlife								
Mule Deer	0	+2	+3	+2	+2	+2	-3	-1
Pronghorn Antelope	0	+1	+2	+1	+1	+1	+1	0
Beaver	0	+3	+5	+3	+3	+3	+3	+3
Waterfowl	0	+3	+5	+3	+1	+1	+3	+1
Sage Grouse	0	+1	+3	+2	+1	+1	-3	0
Valley Quail	0	+2	+4	+2	+1	+1	+2	+1
Nongame	0	+2	+5	+2	+2	+2	-3	0
Fish	0	+3	+5	+3	+1	+2	+3	+1
Poor/Fair (stream miles)	29 mi	10 mi	0 mi	10 mi	22 mi	16 mi	10 mi	22 mi
Fair/Good (stream miles)	3 mi	22 mi	32 mi	22 mi	10 mi	16 mi	22 mi	10 mi
Recreation								
Changes in Visitor Use	0	+2	+3	+2	+2	+2	-1	0
Cultural Resources								
Potential disturbance of unidentified cultural sites and integrity of known sites	0	-2	+1	+1	-1	-1	-2	0
Visual Resources								
Visual Contrast	0	+1	+4	+3	+2	+2	-2	0

Table 8-2 (continued)

Summary and Comparison of Impacts of the Proposed Action and the Alternatives to the Present Situation.

Significant Resource	Present Situation 1/	Proposed Action 2/	1 Eliminate Livestock Grazing	2 Protect Sedimentary Soils & Optimize Wild Horses	3 Adjust Livestock Grazing	4 Implement Only Cost Effective AMPs	5 Optimize Livestock Forage	6 No Action
Wilderness	0	0	+2	+1	0	+1	0	0
Livestock Grazing								
Initial Forage Allocation(AUM)	76,348	67,906	0	36,638	67,906	67,906	73,101	76,348
Projected Forage Allocation(AUM)	N/A	84,097	0	39,159	67,906	73,437	107,536	73,348
Wild Horses								
Forage Allocated (AUM)	0	3,690	3,690	26,585	3,690	3,690	360	0
Disturbance	0	0	-3	-1	+2	+1	-2	0
Ecologically Significant Areas	0	0	+2	+1	0	0	-1	-1
Socioeconomics								
Permittees Affected by Initial Allocation	0	48	82	61	48	48	40	0
Change in livestock forage dependency, number of permittees with:								
0-4.9% loss	0	29	7	52	29	29	10	0
5-9.9% loss	0	10	13	12	10	10	15	0
10-19.9% loss	0	8	19	15	8	8	12	0
20-29.9% loss	0	1	19	6	1	1	2	0
30-39.9% loss	0	0	10	4	0	0	0	0
40-49.9% loss	0	0	10	2	0	0	1	0
Greater than 50% loss	0	0	2	0	0	0	0	0
Livestock Employment (full-time equivalent jobs)	38	33	0	18	33	33	36	38
Perceived Local Social Welfare	No change	Negative	Negative	Negative	Negative	Negative	Positive	No change

Note: Where insufficient data prevent quantification, anticipated changes are expressed using a range of numbers. Present conditions are represented by a zero; an improvement or increase is shown by a positive number between 1 and 5, and a deterioration or decrease is shown by a negative number between -1 and -5. A large number either positive or negative indicaates a larger change from the present than a smaller number.

1/ Refer to Chapter 2 for more information.
2/ Refer to Chapter 1 for more information.

Table 8-3

Comparison of Alternatives to Present Situation in Relation to Statewide (LCDC) Goals

LCDC GOALS AND ALTERNATIVES	ALTERNATIVES 1 Eliminate Livestock Grazing	2 Protect Sedimentary Soils & Optimize Wild Horses	3 Adjust Livestock Grazing	4 Implement Only Cost Effective AMPS	5 Optimize Livestock Forage	6 No Action
I. Citizen involvement	0	0	0	0	0	0
II. Land use planning	0	0	0	0	0	0
III. Preserve agricultural lands	0	0	0	0	0	0
IV. Conserve forest lands	0	0	0	0	0	0
V. Protect natural resources	++	+	+	+	+	-
VI. Improve air and water quality	++	+	0	0	+	-
VII. Protect life and property from natural disasters	0	0	0	0	0	0
VIII. Satisfy recreation needs	+	+	0	0	0	0
IX. Diversity to improve economy	--	-	-	+	++	0
X. Provide for housing needs	0	0	0	0	0	0
XI. Plan and develop public facilities	0	0	0	0	0	0
XII. Provide transportation system	0	0	0	0	0	0
XIII. Conserve energy	0	0	0	0	0	0
XIV. Establish urban growth boundaries	0	0	0	0	0	0

0 Same as present + Slightly more
- Slightly less ++ Substantially more
-- Substantially less

In the potential big sagebrush and riparian communities, the initial increase in plant vigor would lead to a significant increase in desirable plants, plant diversity in the community, and forage production and an improvement in range condition and trend. In a study at the Squaw Butte Experimental Range (30 miles west of the ES area) bluebunch wheatgrass, needlegrass and phlox increased when excluded from grazing (Tueller and Poulton n.d.). However, after a rapid increase, the rate of vegetation change slowed down.

In the long term, individual plants would have larger basal areas, but production would decline. Fewer new plants would be established due to litter accumulation and competition with older grass plants.

The increase in vegetative ground cover, especially litter accumulation, may cause an increase in the number of acres burned by fire. Total vegetation would increase around perennial water sources except in wild horse areas.

8.1.2 Soils

Ground cover (vegetation and litter) would significantly increase on 416,000 acres of potential big sagebrush and riparian communities, and as a result, soil loss from erosion would decrease. More acres would be in the stable erosion condition class, although the increase is not quantifiable. Streambanks would stabilize due to protection from livestock trampling and grazing of riparian vegetation. Small gullies would stabilize due to the increased ground cover. Erosion on most large gullies cannot be checked without control structures.

8.1.3 Water Resources

Due to the additional ground cover, water infiltration would increase. This would result in a moderate decrease in runoff. Coliform contamination of water from livestock would be eliminated on public lands. Sediment yield would decrease due to the increase in ground cover, although the decrease is not quantifiable.

8.1.4 Wildlife

8.1.4.1 Mule Deer and Pronghorn Antelope

Deer and antelope would have an additional 76,348 AUMs available to them in their respective ranges (Figures 2-7 and 2-8). Adverse impacts due to competition with livestock would be eliminated. Lowered use of desirable shrubs would result in lowered shrub mortality and improved vigor. Cover, especially in riparian areas, would be improved. Fence line comparisons of grazed streambanks and adjacent ungrazed streambanks show dense growths of willows on the ungrazed portion and few or no willows on the grazed side (see photo below).

Grazed each summer | Little or no grazing

Comparison of willow growth on the Middle Fork Malheur River, Summer 1976.

Initially, more desirable browse, forbs and grasses would be available. In the long term, reduced forage production due to stagnation would have adverse impacts. Decreased early "green up" of vegetation would be unfavorable to deer and antelope. Overall, reduced competition plus improved shrubs and riparian areas would result in moderately increased deer populations and slightly increased antelope populations.

8.1.4.2 Beaver

Elimination of livestock would greatly improve food for beaver (Figure 2-9). Willows, aspen and alder would increase to support present populations and allow for slight increases.

8.1.4.3 Waterfowl

Waterfowl would be greatly benefited through increased nesting success. Elimination of grazing would allow large amounts of residual vegetation to accumulate along all reservoirs, lakes, and streams (Figure 2-9). Annual reproduction would be expected to increase from present 240 ducks and 160 Canada geese to over 1,200 ducks and 300 geese.

8.1.4.4 Sage Grouse

Brood production would be expected to increase as a result of greatly improved meadow condition. More succulent forbs would be available for longer periods. Decreased gullying due to improved riparian vegetation would reduce meadow losses. Nesting success would improve due to increased residual cover and the elimination of nest disturbance from cattle. Existing sage grouse habitat is shown in Figure 2-8.

8.1.4.5 Valley Quail

Long-term increases of woody and herbaceous riparian vegetation along 75 stream miles would improve winter cover, nesting cover and food (Figure 2-4). Interspersion of grazed private lands would provide a diverse habitat. Larger winter populations and increased nesting success would be expected in all areas.

8.1.4.6 Nongame Wildlife

Greatly increased vegetation would be beneficial to most species. Increased shrub and tree growth in riparian areas (Figure 2-4) would allow birds to nest in previously unoccupied areas. Each year ungrazed grasses and forbs would mature and produce seeds used by many species. Long-term changes in vegetative composition would favor species such as the least chipmunk and spotted frog which are favored by ungrazed conditions. Some species such as black-tailed jackrabbits may decrease as disturbed areas now dominated by annuals were replaced with ungrazed perennial grasses.

8.1.4.7 Fish

Elimination of livestock grazing would improve fish habitat from its present poor/fair condition to at least fair/good on 32 public stream miles (Figure 2-9, Table 2-10). Elimination of bank trampling and heavy use of vegetation by livestock would lead to improved riparian condition, increased streambank stability and reduced siltation. Improved vegetative cover on watersheds would decrease sediment yield and runoff, benefiting fish through decreased flooding, increased summer flows and reduced silt. Carrying capacity of these streams for fish would be greatly increased. Lorz (1974) reported higher trout populations along ungrazed sections of the Little Deschutes River, Oregon. Duff (1978) found higher trout populations in ungrazed portions of Big Creek, Utah, than in grazed sections.

8.1.5 Recreation

The elimination of grazing on public lands would, in most cases, enhance recreational opportunities. In the long term, increased plant diversity would

improve botanical sightseeing. Improved riparian habitat would enhance wildlife viewing. The opportunity to view livestock on public lands, however, would be eliminated. In the long term, moderate increases in wildlife populations could occur, with some resultant increased opportunities for hunting. Fishing opportunities would be enhanced insofar as reduced water turbidity, improved water quality, and improved riparian habitat result under this alternative.

Existing and anticipated recreation use levels would not change significantly under this alternative.

8.1.6 Cultural Resources

The adverse impacts of trampling and erosion in cultural resources would not occur.

Should intermingled private and State lands be fenced to allow for grazing, adverse impacts to cultural resources could occur during construction and trailing of livestock.

8.1.7 Visual Resources

Visual resources would improve. Improved visual quality would be characterized by increased plant diversity; reestablishment of vegetation in riparian and other trampled areas; and creation of irregular textures, patterns, and colors on the landscape. VRM class objectives would be met although some fences needed to keep livestock off public lands may conflict with VRM class objectives.

8.1.8 Wilderness Values

Although many signs of human activity and influence would be eliminated, existing range improvements would signify past human activity. Primitive, unconfined recreation opportunities would be enhanced as the area returns to a natural state. Opportunities for solitude and isolation would also be enhanced. In certain localized areas, fencing to keep livestock off Federal property would adversely affect visual resources and wilderness values on adjacent public lands. The wilderness inventory and suitability studies would continue unaffected.

8.1.9 Land Use

8.1.9.1 Livestock Grazing

All livestock use (76,348 AUMs) would be eliminated from the public lands as well as from many of the smaller tracts of intermingled private lands.

Additional fencing would have to be constructed to keep livestock from trespassing on public lands.

This alternative results in a major land use change from livestock grazing to grazing by wildlife and wild horses. Impacts of this change in land use on operators are discussed in Section 8.1.10 Socioeconomic Conditions.

8.1.9.2 Wild Horses

Competition for forage and the disturbance caused by livestock handling would be eliminated.

Increased fencing of private lands (approximately 130 miles around 13,000 acres) could alter existing movement of the horses and exclude use of existing water on those private lands.

8.1.9.3 Ecologically Significant Areas.

No impacts to ecologically significant areas would occur under this alternative.

8.1.10 Socioeconomic Conditions

The elimination of livestock grazing on public lands would cause permittees to discontinue livestock production; reduce herd sizes; or replace lost forage by purchasing, leasing, and/or producing replacement forage. There would be a wide variation in impacts and necessary adjustments to compensate for economic impacts among individual permittees. As shown in Table 8-2, over 75 percent of the permittees would lose more than 10 percent of the amount of livestock forage necessary to maintain herd sizes at 1976 levels. An individual's financial ability to adapt to this loss of forage would depend on other sources of income, owner's equity, dependence on Federal range, and the particular type of livestock enterprise. Responses would probably vary from reducing breeding stock to buying, selling, or leasing ranches. The type and extent of the responses would be much more extensive than those expected from the proposed management.

The demand for grazing on adjacent private, State, or other Federal land would increase and probably exceed supply. If so, the price of local commercial grazing fees would increase. While real estate values on surrounding private land with other grazing privileges would increase, the base property of those permittees who lost the associated BLM grazing permits would decline in relative value. These ranchers' abilities to borrow operating capital from agricultural lending institutions would also be adversely affected. Although these impacts would be similar to those of the proposed action, they would be more significant and widespread.

Since no local livestock earnings or employment would be generated by this range management alternative, initial annual direct local livestock earnings would be about $430,000 less than 1976 estimated earnings and indirect income would be an estimated $140,000 less. Estimated direct livestock employment would be about 33 less than with the proposed action and 38 less than the 1976 level.

Unfavorable climate conditions would prevent large-scale conversions of private base properties from livestock to crop production. However, changes in livestock enterprises may be feasible for some permittees, e.g., changing from a cow-calf enterprise to a yearling enterprise or *vice versa*. The extent to which these changes would occur cannot be quantified.

The demographic characteristics of the ranchers suggest that some permittees at retirement or near retirement age would probably accept retirement and/or supplement their income by working at part-time seasonal jobs or by selling or leasing sections of their ranches. The percent of those self-employed in agriculture would decline as ranchers joined the wage and salary employees either on a full-time or part-time basis. Some permittees who wish to continue their ranch operations would probably join the 20 percent within Harney County who, in 1974, already worked away from their ranches more than 200 days per year, but this would probably involve major changes in their ranch operations and life styles. Females who had previously worked on the ranch in family operations would be more likely than males to seek non-farm employment.

Local unemployment or underemployment would increase if livestock operations are reduced in size and number. Some young people may be discouraged from continuing family ranch operations and would probably migrate out of the area in search of better employment and income opportunities. Consequently the rural ranch population within the ES area boundaries would probably also decline.

The economic and social impacts of this alternative would cause extensive local reaction. Individuals, businesses, and organizations would publicly oppose this BLM action. Even if a regional or statewide catastrophe, e.g., extended severe drought, insect infestation, or widespread fire, were to cause a widespread reduction or depletion of forage, the elimination of livestock grazing might not be accepted.

Adoption of this alternative would be commonly considered an extreme example of decisionmaking by distant authorities who fail to understand or even care about the well-being of local residents. Since no justification or rationale for this alternative is given, cooperation between BLM or other Federal agencies and local residents may be replaced with protest and/or antagonism.

This alternative would be viewed by some people (not a local majority) as necessary to restore rangelands and streams to former conditions.

8.2 PROTECT SEDIMENTARY SOILS AND OPTIMIZE THE WILD HORSE POPULATION

ALTERNATIVE NO. 2

This alternative provides for a significantly lower level of livestock grazing use, more protection of sedimentary soils, and for a higher level of wild horses than the existing situation. Sedimentary soils consist of soil divisions Alluvial, Basin Terraces and Lakebeds, Older Terraces, and Lacustrine as shown on Figure 2-2. For a listing of the soil units within these divisions, see Appendix D.

Implementing this alternative would require eliminating livestock grazing use on all or parts of 39 allotments as shown on Table 8-4. Range improvements identified for the 39 allotments, as shown in Table 1-6 would not be constructed. Fences needed to restrict livestock use as shown in Table 1-4 would be a part of this alternative.

In this alternative, livestock would be removed from any allotment or pasture where sedimentary soils occupy more than 50 percent of the public land acres. Using this criterion, sedimentary soils are found on 110,675 acres of public lands in 26 allotments and consist of areas underlain by sedimentary deposits having a high erosion susceptibility.

This alternative would also allow wild horses to increase from the 1976 level of 358 to 1,750 head. This is the maximum number of wild horses which can be maintained on the six herd areas without causing long-term damage to the vegetation. Reaching the optimum wild horse level would require elimination of livestock grazing on all or parts of 13 allotments consisting of 215,419 acres of public lands.

Three of the 26 allotments have both wild horses and sedimentary soils. On these allotments priority would be given to protection of sedimentary soils. Therefore, both wild horses and cattle would be removed. Only cattle would be removed from the remaining 23 allotments with sedimentary soil areas.

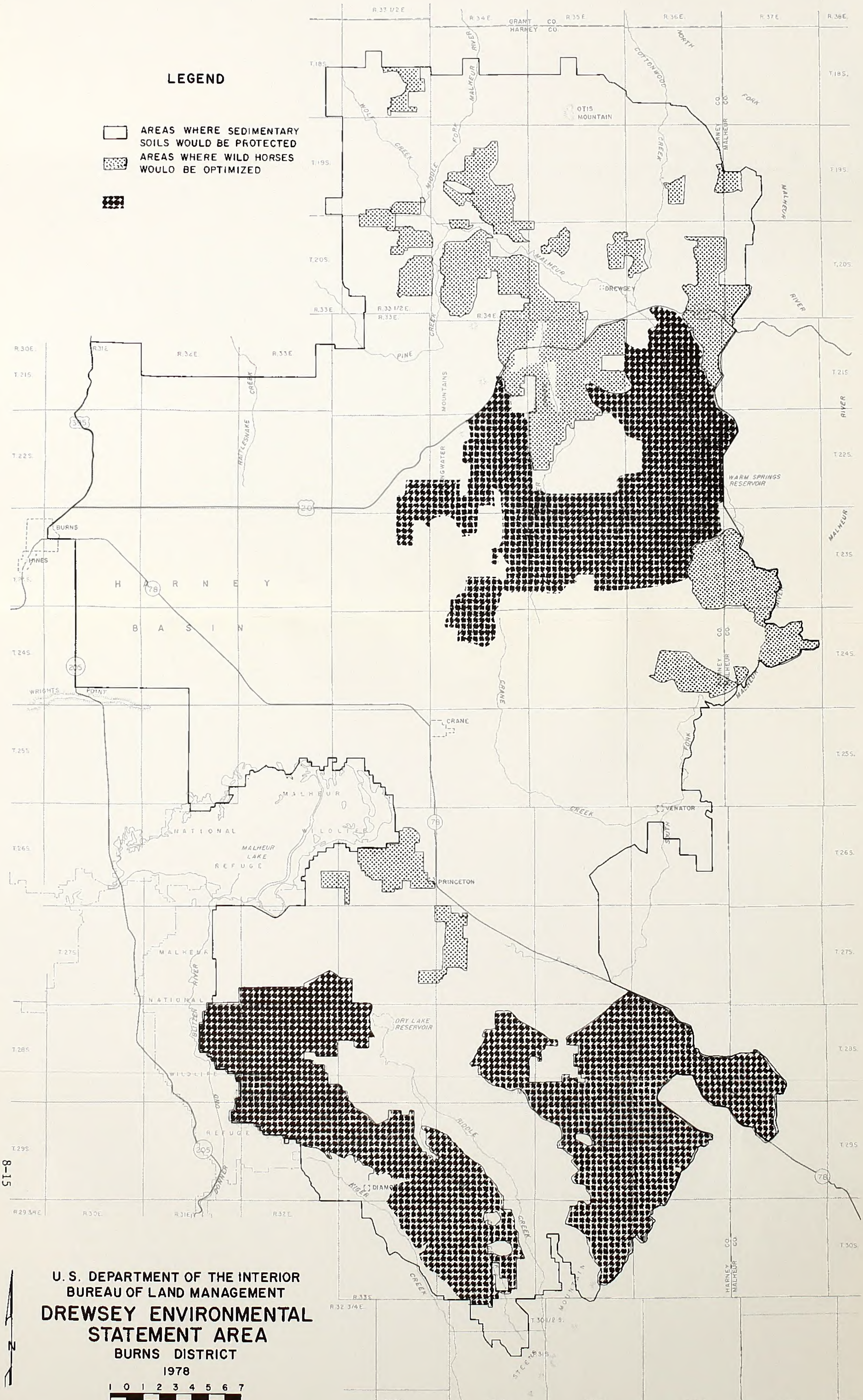
To accommodate the larger wild horse herds, some existing fences would be removed or modified. Existing water developments within the six wild horse herd areas would continue to be maintained. After the optimum level has been reached (within 9 to 18 years), periodic control actions would be taken to maintain the total population at 1,750 animals. The population would vary between 1,500 and 2,300 wild horses. Approximately 800 animals would be removed every 4 years to maintain the optimum population. The allotments affected and livestock grazing use reductions needed to implement this alternative are displayed on Table 8-4 and Figure 8-1.

In this alternative the initial livestock forage allocation to wildlife would be 1,345 AUMs more than in the existing situation. Also, the applicable portions of the proposed action would be implemented on the remaining 86 allotments, consisting of 351,615 acres public lands not affected by sedimentary soils or viable wild horse herds.

Table 8-4

Necessary Livestock Grazing Reductions Under Alternative No. 2

Allotment Name & Number		Livestock AUMs Reduced	Acres Affected	Reason for Reduction
5301	Princeton	184	4,607	Soils
5303	Dry Lake	1,953	16,210	Wild Horses
5304	Square Butte	803	5,001	Wild Horses
5305	Crows Nest	500	2,921	Wild Horses
5306	Rocky Ford	795	4,140	Wild Horses
5307	Smyth Creek	2,969	28,653	Wild Horses
5308	East Kiger	552	7,336	Wild Horses
5313	Burnt Flat	4,568	37,301	Wild Horses
5314	Summit Springs	1,400	10,873	Wild Horses
5315	S. Fork Malheur	2,362	27,265	Wild Horses
5317	Hatt Butte	103	1,566	Soils
5322	Briggs	230	1,030	Soils
5505	Little Muddy	294	3,968	Soils
5506	Muddy	43	675	Soils
5508	Baker Knowles	38	845	Soils
5509	William Dripp Spr.	91	1,345	Soils
5511	Moffett Table	117	2,566	Soils
5512	Clark's River	40	318	Soils
5513	Shelly	146	2,685	Soils
5514	Coal Mine Creek	81	1,922	Soils
5521	Rocky Basin	73	1,043	Soils
5523	Hart	200	1,309	Soils
5526	Chalk Hills	531	6,238	Soils
5528	Cooler	210	2,955	Soils
5529	House Butte	1,513	18,464	Soils
5530	River	882	19,652	Wild Horses
5531	Stinkingwater	2,345	23,741	Soils & Wild Horses
5532	Mountain	2,912	38,623	Wild Horses
5535	Miller Canyon	232	6,732	Wild Horses
5537	Buck Mountain	411	4,630	Soils
5538	Riverside	1,300	10,990	Soils
5539	W&C Blaylock	30	410	Soils
5540	Luce Field	13	225	Soils
5544	Brook Field	50	515	Soils
5550	Jordan	6	60	Soils
5557	J&G	28	180	Soils
5564	Wheeler Basin	530	4,981	Soils & Wild Horses
5565	Upton Mountain	1,333	13,407	Soils & Wild Horses
5566	Texaco Basin	1,400	10,712	Wild Horses
	Total AUMs Reduced	31,268	326,094	



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

1978

SCALE IN MILES

FIGURE 8-1

ALTERNATIVE NO. 2 - PROTECT SEDIMENTARY SOILS AND OPTIMIZE WILD HORSES

8.2.1 Vegetation

The impacts on vegetation on allotments with sedimentary soils would be the same as under Alternative No. 1.

On allotments with wild horses, plant vigor and composition would remain about the same as the present situation, since continuous year-long use by wild horses would not allow the grazed plants in horse concentration areas to replenish food reserves necessary for maintaining vigor and reproduction. The existing amount of livestock forage production (26,585 AUMs) and persistent ground cover would remain the same, as would range condition. Presently, approximately half of the 215,419 acres are in good condition and half in fair condition. Woody riparian vegetation would increase because horses generally do not eat woody plants.

On allotments not affected by sedimentary soils or wild horses, the forage allocation, grazing systems and range improvements would cause plant vigor and percent composition of desirable plants to increase. This would result in moderate increases in total livestock forage production, vegetative ground cover and range condition (about 191,000 acres would be in good condition; 82,500 acres in fair; and no acres in poor condition), the same as the proposed action. Riparian vegetation would increase on allotments with early and rest rotation grazing systems since these systems allow woody riparian species to meet their growth requirements. Riparian vegetation would also increase on 13,000 acres proposed for exclusion or restriction of livestock grazing. Riparian vegetation would remain in poor condition on the remainder of the allotments to be grazed by livestock.

For the ES area as a whole, range condition, livestock forage production and persistent ground cover would increase slightly due to increases in plant vigor and percent composition of desirable plant species.

8.2.2 Soils

The impacts on soils from eliminating livestock grazing on allotments with sedimentary soils would be the same as under Alternative No. 1.

On allotments with wild horses, soil erosion would be about the same as at present, due to continuous use by horses. However, streambank erosion would decrease as woody plants in riparian areas increase. Horses do not trample streambanks to the extent cattle do nor do they usually eat woody vegetation.

On allotments grazed by livestock, the increases in plant vigor and composition from forage allocation, grazing systems, and range improvements would increase ground cover and protect the soil from erosion. About 225,000 acres would be in stable erosion condition class; 47,000 acres would be in slight; 1,500 acres would be in the moderate erosion condition class; and no acres in the critical or severe classes.

Streambank erosion would continue at about the present rate on allotments with continuous, rotation, deferred, and deferred rotation grazing systems. Streambanks in allotments with early and rest rotation grazing systems would partially stabilize due to the increase in woody riparian species. The fencing of 22 miles of perennial streams described in Table 1-4 and 1-8 to eliminate or restrict livestock grazing would allow riparian vegetation to increase and help stabilize streambanks.

For the ES area as a whole, soil erosion would decrease slightly and streambank erosion would decrease moderately.

8.2.3 Water Resources

The impacts on water resources on allotments with sedimentary soils would be the same as under Alternative No. 1.

On allotments with wild horses, coliform contamination of water would continue though the source would be from horses instead of livestock. Since ground cover would not increase, runoff and sediment yield would remain at about the present levels.

On all other allotments, the construction of range improvements would cause better distribution of livestock, and would therefore reduce coliform contamination of streams. The increase in ground cover would cause a decrease in runoff and sediment yield, the same as under the proposed action. Short-term increases in sediment yield from the construction of range improvements would amount to 6.4 acre-feet per year or a 3 percent increase over the present sediment yield of 227.4 acre-feet per year.

For the ES area as a whole, runoff, sediment yield, and coliform contamination of water would decrease slightly.

8.2.4 Wildlife

8.2.4.1 Mule Deer and Pronghorn Antelope

On 60,000 acres of big game habitat where sedimentary soils are protected, forage competition with livestock would be eliminated. Initially, more desirable browse, forbs and grasses would be available. Over the long term, moderate reductions in forage production would occur due to underutilized plants.

Optimizing wild horses would be beneficial to big game because of the horse's heavy preference for grass. Shrubs, which make up the bulk of antelope and deer diets during critical winter periods, are normally totally excluded from horse diets. Horses at optimum numbers may compete with big game for shrubs during periods of crusted snow when grass cannot be obtained.

For the remainder of the ES area, this alternative is the same as the proposed action. Increased forage would be slightly beneficial as discussed in Chapter 3. Forage allocation and new grazing systems would decrease forage competition and increase plant vigor. New reservoirs would have overall slightly adverse impacts due to increased forage competition with livestock. Seedings would increase spring forage.

The interspersion of ungrazed, cattle-grazed, and horse-grazed pastures would moderately improve food and cover. Preferred food plants would be available in at least some pastures during all seasons of the year. Moderately increased deer populations and slightly increased antelope populations would be expected.

8.2.4.2 Beaver

Exclusion of horses and livestock from Smyth Creek and Stinkingwater Creek would improve food as described in Chapter 3 (Figure 2-9, Table 1-8). Beaver would maintain or increase their populations on public lands.

8.2.4.3 Waterfowl

There is little use by waterfowl where sedimentary soils would be protected by elimination of livestock. No significant impacts would occur from the elimination of grazing in these areas.

Optimizing wild horses would not adversely affect waterfowl because horses would be excluded from Mahon Reservoir and portions of Warm Springs Reservoir (Table 1-8).

Exclosures at five reservoirs and the new rest rotation system at Dry Lake would greatly improve nesting cover and food as described in Chapter 3 (Figure 2-9, Table 1-8). Annual waterfowl production would increase from the present 400 birds to over 1,250.

8.2.4.4 Sage Grouse

Sage grouse would be greatly benefited where sedimentary soils would be protected by elimination of livestock (Table 8-4, Figure 2-8). Impacts would be as described in Alternative No. 1. Brood survival would be expected to increase as a result of greatly improved meadow condition. Nesting success would improve due to increased residual cover and the elimination of nest disturbance from cattle.

Sage grouse would be slightly benefited in the short term by optimizing wild horse populations. Initial low horse numbers would allow meadows to improve with resulting increases in brood survival. Nesting success would improve due to decreased disturbance and increased residual cover. As horse numbers reach

optimum numbers (within 9 to 18 years), impacts would be slightly adverse. Yearlong grazing would eventually result in deteriorated meadows. Nesting success would decrease with decreased residual cover and increased nest disturbance.

For the remainder of the ES area, impacts to sage grouse would be the same as outlined in Chapter 3. Livestock exclusion and restricted use would improve meadows along 22 stream miles and increase brood survival (Table 1-4, 1-8). Nesting cover would improve where continuous grazing is replaced with rest rotation and deferred rotation. New reservoirs would improve summer distribution. Spring developments would be adverse due to overall loss of meadow vegetation.

For the entire ES area, sage grouse population may increase slightly in response to an overall minor improvement of brood rearing habitat and nesting cover.

8.2.4.5 Valley Quail

Elimination of grazing on sedimentary soils would improve winter cover along 7 stream miles, greatly benefiting quail (Allotments 5514, 5531, 5538, 5564). Quail would be slightly benefited in the short term by optimizing wild horse populations. Initial low horse numbers would result in improved winter cover and nesting success along 19 stream miles (Figure 2-4). As horse numbers reach optimum numbers, impacts would be slightly adverse. Heavy use in riparian areas would reduce cover for quail. Decreased winter populations and nesting success would be expected.

For the remainder of the ES area, impacts to quail would be similar to the ones outlined in Chapter 3 (Table 3-9). Grazing exclusion and restrictive use would greatly improve winter cover on 22 stream miles. Rest rotation and early grazing would moderately improve winter cover on 14 stream miles. Winter cover would not improve from its present poor condition along 13 stream miles with continuous, deferred and deferred rotation systems.

For the entire ES area, habitat along 43 stream miles would improve and 32 miles would remain in poor condition. Winter populations and nesting success would be expected to increase slightly.

8.2.4.6 Nongame Wildlife

Increased vegetation would be greatly beneficial where sedimentary soils would be protected by the elimination of livestock and horses. Impacts would be as described in Alternative No. 1.

Elimination of livestock coupled with initial low horse numbers would result in improved vegetative cover, especially in riparian areas. As horse populations reach optimum numbers after 10 years, vegetation would deteriorate and

nongame animals would be adversely impacted. Horse areas would not receive rest or deferrment during the growing season. Residual cover important for reproduction would be reduced.

For the remainder of the ES area, increased residual cover and perennial grasses would be beneficial as described in Chapter 3. Brush control and spring developments would have minor adverse impacts to cover, nesting sites and food.

For the entire ES area, increased vegetation, improved riparian areas and new reservoirs would improve habitat. Brush control, spring developments and horse grazing would have adverse impacts. Overall, conditions would improve slightly resulting in increased distribution and numbers of most species.

8.2.4.7 Fish

No direct impacts to fish would occur with protection of sedimentary soils because none are found in these areas. Increased vegetative cover on protected watersheds would improve fish habitat elsewhere in the ES area by decreasing sediment and runoff.

Heavy horse use would result in continued poor/fair condition along 2 miles of Stinkingwater Creek in Allotment 5532. For the remainder of the ES area, impacts would be the same as outlined in Chapter 3. Slight increases in fish production are expected on 22 miles of public streams which would improve one condition class due to livestock exclusion, restrictive use and rest rotation. Heavy livestock use and no improvement is expected on 8 miles of streams.

Slight increases in fish production may occur on 22 miles of public streams which would improve up to one condition class. Heavy use by cattle or horses along 10 public stream miles would result in static or decreasing populations.

8.2.5 Recreation

Impacts of forage allocation, grazing systems and range improvements would be the same as for the proposed action. Wildlife sightseeing opportunities would be enhanced as wildlife and wild horse populations increase. Hunting opportunities would not be significantly affected.

8.2.6 Cultural Resources

Artifact damage or disturbance would be similar to that expected from the proposed action. Protection of sedimentary soils would preserve any unidentified cultural sites in 110,675 acres. Construction of range improvements on the remaining 86 allotments would have the same impacts as described in Chapter 3.

8.2.7 Visual Resources

The elimination of livestock grazing use on all or part of 39 allotments would allow for VRM class objectives to be more easily met than under the existing situation. The impacts of range improvements where constructed would be the same as for the proposed action.

The removal or modification of some fences in wild horse areas would benefit the visual resource.

8.2.8 Wilderness Values

All proposed range improvements and grazing systems would be subject to the constraints of the wilderness inventory procedures. No significant impacts are anticipated. The removal or modification of some fences in wild horse areas would eliminate some signs of human activity.

8.2.9 Land Use

8.2.9.1 Livestock Grazing

Elimination of livestock grazing on 39 allotments would result in a loss of 31,268 AUMs of livestock forage. There would be a long-term increase in livestock forage production of 2,521 AUMs on the 86 allotments grazed by cattle.

Elimination of livestock grazing on 110,675 acres with sedimentary soils would alter the land use from livestock grazing to watershed protection. Optimizing wild horses would change the use on 215,419 acres from livestock grazing to wild horse grazing. Impacts of changing land use on livestock permittees are described in Section 8.2.10.

8.2.9.2 Wild Horses

Six wild horse herds would reach their optimum level of 1,750 animals within 9 to 18 years.

Portions of the existing Stinkingwater and Middle Fork herd areas would be eliminated to protect sedimentary soils. This would require removing horses from the Wheeler Basin Allotment 5564, and parts of the Stinkingwater Allotment 5531 and Upton Mountain Allotment 5565. Sufficient forage would still be available on the remaining area to support the optimum herd size.

Eliminating livestock grazing and the associated management activities would remove a major source of forage competition and disturbance. Periodic removal of horses to maintain optimum numbers would cause minor disturbance; however, the overall short and long-term impact of this alternative would be moderately beneficial to wild horses.

8.2.9.3 Ecologically Significant Areas

Ecological values would be undisturbed on all or part of 39 allotments. Damage due to trampling and erosion could occur on the remaining 86 allotments.

8.2.10 Socioeconomic Conditions

Permittees would discontinue livestock production; reduce herd sizes; or purchase, lease, or produce replacement forage in order to maintain herd sizes. Different permittees would be affected differently and impacts to individual ranchers would change as the price of forage changes and the ability to borrow operating capital from agricultural lending institutions is constrained.

Expected annual local direct livestock earnings would be about $207,000 and indirect income would be about $66,000. The full-time equivalent livestock employment related to grazing on public lands would decline to about 18 jobs and rural ranch populations in the ES area would probably also decline.

Impacts on individual permittees would be similar to those described for the proposed action. As shown in Table 8-2, 52 permittees would be affected by this alternative. Some livestock enterprises would be modified, some permittees would retire or accept part-time employment and others would supplement their incomes by selling or leasing sections of their ranches.

The social impacts and reactions to this alternative would be similar to but not as extensive as those described in the discussion of Alternative No. 1. Local disapproval would be inevitable. Residents would believe that soil conservation and the well-being of wild horses were being promoted at the expense of the economic and social welfare of local ranchers and businesses.

Persons interested in preserving wild horses may approve the optimization of the wild horse population, but periodic removal of approximately 800 animals every 4 years would probably be objectionable.

8.3 ADJUST LIVESTOCK GRAZING USE

ALTERNATIVE NO. 3

In this alternative, no new range improvements or grazing systems would be completed and livestock grazing would be managed using the present methods. Fences needed for restrictive use (Table 1-4) would not be a part of this alternative. Forage allocation of 67,906 AUMs to livestock would be 8,442 AUMs less than the existing situation. However, livestock forage allocations of 1,345 AUMs to wildlife, 3,960 AUMs to wild horses, and 5,956 AUMs to watershed would be greater than the existing situation as shown in Table 8-1. Wild horse populations would not exceed 330.

The 28 existing AMPs and all existing range improvements would continue to be maintained or revised as needed. The allotments affected and the livestock use adjustments needed to implement this alternative are displayed in Table 8-5.

Existing grazing systems would continue unchanged on all allotments. All grazing seasons would remain the same as the proposed action and are shown in Table 8-5.

8.3.1 Vegetation

By adjusting grazing to the forage carrying capacity, plant vigor and vegetative ground cover would increase. Percent composition of desirable plants would also increase on allotments with grazing systems other than continuous (457,000 acres). Range condition and livestock forage production would increase slightly, but since these increases are not quantifiable, projected AUMs would remain the same as the initial forage allocation (79,167 AUMs).

Riparian vegetation would improve on the allotments (129,000 acres) under early and rest rotation grazing systems, and on the 2,600 acres proposed for exclusion of livestock grazing. Riparian vegetation would continue in poor condition on the remainder of the ES area.

8.3.2 Soils

Adjusting livestock grazing to the forage carrying capacity would cause a slight increase in ground cover. Because less forage would be used, more plant material would be left at the end of each growing season. The increased ground cover would protect the soil from erosion. Streambank erosion would continue at about the present rate on allotments with continuous, deferred, deferred rotation, and rotation grazing systems (approximately 507,700 acres). The streambanks within the 128,700 acres with early and rest rotation grazing systems would partially stabilize due to the increase in woody riparian species. The fencing of 10.7 miles of perennial streams to eliminate livestock grazing would allow riparian vegetation to increase and help stabilize streambanks.

8.3.3 Water Resources

There would be no significant change in the present level of runoff or coliform contamination of water. Sediment yield would decrease slightly as ground cover increases.

Table 8-5

Alternative No. 3

Allotment Name and Number	Public Land (acres)	Type and Acreage of Grazing Use	Proposed Maximum Season of Use	1976 Authorized Use (AUMs) 1/	Proposed Cattle Grazing Adjustment (AUMS)	Percent Change	Proposed Initial Forage Allocation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Carrying Capacity
5001 Crane	1,280	L.I.M 2/	05/25-06/24	34	--		34	--	--	--	34
5002 Catterson	80	L.I.M.	04/01-08/31	9	--		9	--	--	--	9
5003 Malheur Slough	799	L.I.M.	05/01-08/31	66	--		66	--	--	--	66
5004 Miller Field	80	L.I.M.	07/01-09/30	9	--		9	--	--	--	9
5005 Harris FFR	160	L.I.M.	04/16-07/31	22	--		22	--	--	--	22
5101 Devine Ridge	8,642	E-6,892,F-1,750	04/01-09/30	1,257	-470	37	787	22	--	--	809
5102 Prather Creek	1,025	A-1,025	06/01-07/31	41	--		41	8	--	--	49
5103 Lime Kiln	3,314	E-3,314	04/16-07/31	222	--		222	5	--	--	227
5104 Soldier Creek	2,673	E-2,673	04/16-07/31	102	--		102	3	--	--	105
5105 Camp Harney	13,552	E-13,552	04/16-06/19	854	+14	2	868	25	--	--	--
5106 Cow Creek	2,114	B-904,D-45,	05/01-08/31	336	-106	32	230	4	--	--	234
		E-645,F-520									
5107 Manning Field	120	L.I.M.	06/01-07/31	10	--		10	--	--	--	10
5108 Little Cow Crk.	2,777	A-2,777	04/16-08/15	468	-71	15	397	8	--	63	468
5109 Purdy FFR	73	L.I.M.	04/01-09/30	48	--		48	--	--	--	48
5110 Reed FFR	130	L.I.M.	06/01-09/15	18	--		18	--	--	--	18
5111 Temple FFR	360	L.I.M.	04/01-10/31	28	--		28	--	--	--	28
5112 Smith FFR	120	L.I.M.	Exchange of Use								
5201 Coleman Creek	2,900	D-2,900	04/01-10/15	424	--		424	5	--	71	500
5202 Hunter	2,648	A-2,648	04/01-08/31	940	-487	52	453	12	--	12	477
5203 Catterson	640	A-640	04/01-06/30	125	-57	46	68	5	--	--	73
5204 Slocum Field	1,917	D-1,917	04/01-08/31	300	--		300	7	--	7	314
5205 Venator	2,589	D-2,589	04/01-07/31	320	--		320	5	--	--	325
5206 Stockade	910	L.I.M.	04/01-08/15	162	-100	62	62	--	--	--	62
5207 Coyote Creek	1,077	C-1,077	05/01-07/31	110	--		110	--	--	--	110
5208 Emmerson	1,538	A-1,538	05/01-07/31	224	--		224	6	--	30	260
5209 Crane	1,935	C-1,935	05/05-08/18	350	--		350	--	--	--	350
5210 Windy Point	1,051	D-1,051	04/15-09/30	50	--		50	3	--	--	53
5211 Beckly Home	1,494	A-1,494	06/01-10/15	109	+1		110	3	--	--	113
5212 Mahan Ranch	3,058	C-1,359,D-1,699	04/01-09/30	334	--		334	5	--	--	339
5213 Beaver Creek	8,572	D-8,572	04/16-07/31	1,200	-300	25	900	6	--	--	906
5214 Hamilton	2,445	C-2,445	04/01-10/31	245	--		245	2	--	59	306
5215 Davies	3,442	A-3,442	04/01-09/30	258	--		258	2	--	19	279
5217 Thompson FFR	498	D-498	04/15-09/30	Information shown with Mahan Ranch Allotment #5212							
5218 Bennett's FFR	320	L.I.M.	04/01-09/30	18	--		18	--	--	--	18
5301 Princeton	18,288	A-9,207,D-9,081	04/16-07/31	1,917	--		1,917	5	--	--	1,922
5302 Big Bird	2,567	E-2,567	04/01-06/30	418	--		418	--	--	95	513
5303 Dry Lake	34,729	D-34,729	04/01-10/31	2,741	+639	23	3,380	120	--	--	3,500
5304 Square Butte	5,001	E-5,001	04/01-08/31	625	+178	29	803	1	--	29	833
5305 Crow's Nest	2,921	E-2,921	05/01-06/30	500	--		500	--	--	--	500
5306 Rocky Ford	4,457	C-317,D-4,140	04/16-08/31	900	--		900	--	--	214	1,114
5307 Smyth Creek	29,283	A-14,085,B12,019	04/01-07/31	3,095	--		3,095	16	600	--	3,711
		D-3,179									
5308 East Kiger	7,336	A-7,336	04/15-07/15	552	--		552	6	360	--	918
5309 Happy Valley	4,004	E-4,004	04/16-10/15	528	--		528	1	--	1	530
5310 Riddle Mountain	20,188	B-9,919,E-10,269	04/01-10/31	3,085	--		3,085	11	--	--	3,096

Table 8-5 Alternative No. 3 (Continued)

Allotment Name and Number	Public Land (acres)	Type and Acreage of Grazing Use	Proposed Maximum Season of Use	1976 Authorized Use (AUMs) 1/	Proposed Cattle Grazing Adjust-ment (AUMS)	Percent Change	Proposed Initial Forage Allocation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Carrying Capacity
5311 Government Fld.	1,339	B-1,339	07/16-08/15	150	—		150	2	—	—	152
5312 Deep Creek	1,000	B-1,000	07/16-10/15	207	—		207	1	—	—	208
5313 Burnt Flat	36,896	A-25,563,C11,333	04/01-10/31	4,568	—		4,568	27	600	—	5,195
5314 Summit Springs	10,873	A-10,873	04/01-06/30	1,400	—		1,400	7	—	—	1,407
5315 S. Fk. Malheur	38,140	B-23,265,C10,884 E-3,991	04/01-09/30	3,519	—		3,519	7	840	1,231	5,597
5316 Virginia Valley	16,270	C-5,586,D-10,684	04/01-08/31	3,140	+513	16	3,653	13	—	—	3,666
5317 Hatt Butte	1,566	L.I.M.	10/01-10/31	103	—		103	--	—	—	103
5319 Driveway	1,680	No Licensed Use									
5321 Hamilton Indiv.	1,121	B-1,121	08/01-09/30	142	+1		143	—	—	—	143
5322 Briggs FFR	1,030	L.I.M.	08/01-09/30	230	—		230	—	—	—	230
5323 Clemens FFR	240	L.I.M.	04/16-08/31	78	—		78	—	—	—	78
5324 West Kiger	1,384	E-1,384	04/01-06/30	230	—		230	—	—	—	230
5325 Marshall FFR	320	L.I.M.	04/16-08/15	40	—		40	—	—	—	40
5326 Jenkins NL FFR	80	L.I.M.	04/01-06/30	30	—		30	—	—	—	30
5327 Jenkins FFR	1,480	L.I.M.	08/01-09/30	280	—		280	—	—	—	280
5501 E.Fk.Cow Creek	2,504	A-2,504	04/20-08/31	329	-63	19	266	4	—	—	270
5502 Rock Creek	4,000	B-433,D-440, E-2,857,F-270	04/16-10/15	446	+64	14	510	21	—	—	531
5503 Pine Creek	18,845	A-13,201,F-5,644	04/01-08/31	2,438	-154	6	2,284	57	—	109	2,450
5504 State Field	280	L.I.M.	04/16-06/15	48	—		48	—	—	—	48
5505 Little Muddy	7,215	A-1,458,B-849, D-4,908	05/01-10/31	1,107	-345	31	762	56	—	—	818
5506 Muddy	4,128	A-3,453,F-675	05/01-11/15	484	-84	17	400	27	—	—	427
5507 Wolf Creek	870	A-870	04/01-06/15	136	—		136	—	—	—	136
5508 Baker Knowles	845	E-845	05/01-05/31	75	-37	49	38	4	—	—	42
5509 William Dripp Sp	1,345	E-1,345	05/16-06/30	176	-85	48	91	4	—	—	95
5510 Jones Dripp Spr.	762	A-762	05/16-08/15	120	—		120	2	—	2	125
5511 Moffet Table	15,212	D-5,977,E-9,235	04/16-09/30	1,908	-382	20	1,526	32	—	3/ 350	1,908
5512 Clark's River 4/	318	A-318	04/01-08/31	40	—		40	—	—	5	45
5513 Shelly & FFR	5,343	A-5,343	05/01-07/31	332	-32	10	300	20	—	12	332
5514 Coal Mine Creek	4,577	A-4,577	05/01-08/31	412	-176	43	236	7	—	50	293
5515 Mule Creek	4,597	E-2,443,F-2,154	04/16-09/15	488	-176	36	312	11	—	—	323
5516 Birch Creek	1,340	B-1,340	07/01-09/25	243	—		243	16	—	21	280
5517 Otis Mountain	12,991	E 12,991	04/16-09/30	1,738	—		1,738	29	—	—	1,767
5518 Newell Field	990	C-990	04/01-08/31	155	—		155	3	—	7	165
5519 Big Upson Field	220	L.I.M.	11/01-12/31	42	-17	40	25	—	—	—	25
5520 Little Upson	150	A-150	04/01-08/31	24	—		24	—	—	—	24
5521 Rocky Basin	3,775	A-3,775	04/01-08/31	467	-145	31	322	8	—	—	330
5522 Cottonwood	8,397	D-8,397	04/16-09/30	1,183	-342	29	841	9	—	—	850
5523 Hart	1,309	A-1,309	04/16-05/16	260	-60	23	200	26	—	34	260
5524 Tub Springs	4,169	D-4,169	04/16-09/24	795	-395	50	400	6	—	60	466
5525 Mill Gulch	2,284	A-2,284	05/01-08/31	525	-275	52	250	4	—	46	300
5526 Chalk Hills	8,951	E-8,951	04/20-08/15	1,155	-325	28	830	25	—	300	1,155
5527 Drinkwater Summit	2,789	C-2,789	04/01-04/30	462	-236	55	226	15	—	—	241
5528 Cooler	5,020	B-2,065,E-2,955	04/16 09/24	530	-180	34	350	25	—	100	475

Table 8-5 Alternative No. 3 (Continued)

Allotment Name and Number	Public Land (acres)	Type and Acreage of Grazing Use	Proposed Maximum Season of Use	1976 Authorized Use (AUMs) 1/	Proposed Cattle Grazing Adjustment (AUMS)	Percent Change	Proposed Initial Forage Allocation: Livestock (AUMs)	Wildlife (AUMs)	Wild Horses (AUMs)	Watershed (AUMs)	Total Carrying Capacity
5529 House Butte	26,104	A-6,670,C-3,837, D-7,640,E-6,780, F-1,177	04/01-08/31	2,541	-616	24	1,925	49	—	475	2,449
5530 River	19,652	B-19,652	11/01-12/31	1,409	-527	37	882	23	600	250	1,755
5531 Stinkingwater	23,741	B-11,974,D-8,361 E-3,406	04/15-11/30	3,055	-710	23	2,345	75	240	500	3,160
5532 Mountain	37,211	D-37,211	05/01-09/30	3,054	-142	5	2,912	42	620	100	3,674
5533 Buchanan	2,328	D-2,328	04/01-10/31	154	—		154	7	—	102	263
5534 Mahan Creek	2,545	E-1,775,F-770	04/16-07/15	274	-1		273	13	—	—	286
5535 Miller Canyon	6,732	A-6,732	05/01-08/31	740	-508	69	232	73	—	25	330
5536 Alder Creek	29,949	A-29,949	05/01-08/31	2,552	-552	22	2,000	128	—	300	2,428
5537 Buck Mountain	14,719	A-14,719	04/01-08/31	1,500	—		1,500	36	—	385	1,921
5538 Riverside	14,191	D-14,191	04/01-08/31	2,462	-783	32	1,679	17	—	400	2,096
5539 W&C Blaylock	410	L.I.M.	11/01-12/31	30	—		30	49	—	—	79
5540 Luce Field	225	L.I.M.	12/01-12/31	13	—		13	—	—	—	13
5541 Wilber FFR	1,233	C-1,233	04/16-09/30	100	—		100	5	—	—	105
5542 Marshall FFR	302	L.I.M.	04/16-08/15	12	+8	67	20	—	—	—	20
5543 Devine Fld. FFR	630	L.I.M.	04/01-10/31	105	—		105	—	—	—	105
5544 Brooks Field	515	A-515	04/23-05/31	50	+18	36	68	—	—	—	68
5545 Sunshine Field	463	L.I.M.	06/01-09/30	52	—		52	—	—	—	52
5546 Drewitt Fld & FFR	746	L.I.M.	04/16-11/30	30	-8	27	22	—	—	—	22
5547 Lake Field	160	L.I.M.	04/01-10/30	21	—		21	—	—	—	21
5548 Beaubian FFR	740	L.I.M.	09/01-10/31	116	—		116	—	—	—	116
5549 Howard FFR	392	L.I.M.	10/01-11/30	30	—		30	—	—	—	30
5550 Jordan FFR	60	L.I.M.	05/01-05/31	6	—		6	—	—	—	6
5551 Lillard FFR	40	L.I.M.	04/01-09/15	17	-10	59	7	—	—	—	7
5552 Miller FFR	320	L.I.M.	04/16-04/30	20	—		20	—	—	—	20
5553 Miller FFR	40	L.I.M.	04/01-08/31	5	—		5	—	—	—	5
5554 Miller J. Francis	320	L.I.M.	05/01-07/15	25	+4		29	—	—	—	29
5555 Ott FFR	64	L.I.M.	04/01-08/31	5	—		5	—	—	—	5
5556 Pine Creek FFR	1,298	L.I.M.	04/01-12/31	180	—		180	—	—	—	180
5557 J&G FFR	180	L.I.M.	04/01-10/31	28	—	16	28	—	—	—	28
5558 J&G FFR	130	L.I.M.	09/01-11/3	33	—		33	—	—	—	33
5559 Sword FFR	180	L.I.M.	11/01-12/31	32	—		32	—	—	—	32
5560 Vicker's FFR	470	L.I.M.	04/01-06/30	75	-23	31	52	—	—	—	52
5561 Pat Wilber FFR	1,335	L.I.M.	04/01-04/30	121	—		121	—	—	—	121
5562 Williams FFR	240	L.I.M.	08/01-10/31	24	—		24	—	—	—	24
5563 Arnold FFR	160	L.I.M.	09/01-09/30	23	—		23	—	—	—	23
5564 Wheeler Basin	4,981	F-4,981	04/19-04/30	735	-205	28	530	11	—	43	584
5565 Upton Mountain	13,407	D-13,407	05/01-09/30	1,530	-197	13	1,333	24	—	149	1,506
5566 Texaco Basin	10,712	B-10,712	05/01-09/30	1,900	-500	26	1,400	29	100	300	1,829
TOTALS	654,997			76,348	-8,442		67,906	1,345	3,960	5,956	79,167

1/ Average AUMs of livestock use for the past several years.
2/ Less Intensive Management (L.I.M.).
3/ 250 AUMs for primitive and visual values.
4/ Sheep grazing use only; all other allotments are grazed by cattle.

A = Continuous Grazing
B = Deferred Grazing
C = Rotation Grazing
D = Deferred Rotation Grazing
E = Rest Rotation Grazing
F = Early Use

8.3.4 Wildlife

8.3.4.1 Mule Deer and Pronghorn Antelope

Increased forage availability would be moderately beneficial to deer and antelope as discussed in Chapter 3. Significant impacts would occur on 31 allotments covering 271,000 public acres where livestock reductions range from 20 to 69 percent (Table 8-5). Decreased stocking rates would improve grass and shrub vigor.

8.3.4.2 Beaver

Exclusion of livestock from Smyth Creek and Stinkingwater Creek would improve food as described in Chapter 3 (Figure 2-9, Table 1-8). Beaver would maintain or increase their populations on public lands.

8.3.4.3 Waterfowl

Dry Lake would continue to be grazed with a deferred rotation system; nesting cover and food would remain in its present poor/fair condition. Livestock exclosures at Mahon Reservoir, Warm Springs Reservoir, House Butte Reservoir, and two unnamed reservoirs in Allotment 5529 would greatly improve nesting cover and food (Figure 2-9, Table 1-8).

Annual waterfowl production would be expected to increase from the present 400 birds to over 500.

8.3.4.4 Sage Grouse

Increased nesting cover, reduced nest disturbance and increased availability of forbs would be slightly beneficial. Sage grouse populations may increase slightly in response to improved habitat.

8.3.4.5 Valley Quail

Livestock exclosures, early grazing and rest rotation would improve winter cover and nesting habitat and food along 26 stream miles (Figure 2-4, Tables 3-9, 1-8). Habitat would remain in poor or fair condition along 49 stream miles. Overall, winter populations and nesting success would increase slightly.

8.3.4.6 Nongame Wildlife

Decreased livestock use from forage allocation would increase residual and current year's vegetation, slightly improving food and cover.

8.3.4.7 Fish

Forage allocation in conjunction with exclosures would greatly improve fish habitat along 10 miles of public stream. Fish habitat would improve from poor/fair to fair/good with a slight increase in carrying capacity. Fish habitat would remain in mostly poor/fair condition along 22 public miles as a result of heavy livestock use and severe bank trampling by cattle. Populations in these areas would be expected to remain static or decrease.

8.3.5 Recreation

Existing or projected recreation use would not change significantly. In the short term, higher quality recreation experiences would be available under this alternative. Over the long term, recreational quality would decline due to losses in wildlife sightseeing opportunities.

8.3.6 Cultural Resources

Damage due to trampling and erosion would continue as at present.

8.3.7 Visual Resources

Objectives for all VRM classes would be met. Less degradation of visual resources would occur as less forage is allocted to livestock.

8.3.8 Wilderness Values

No significant impacts are anticipated.

8.3.9 Land Use

8.3.9.1 Livestock Grazing

The overall downward adjustment in livestock use (8,442 AUMs) would occur as with the proposed action. Impacts would be the same as in the proposed action.

8.3.9.2 Wild Horses

The downward adjustment in livestock use in the herd management areas would reduce competition between cattle and the wild horses. This would result in a long-term minor beneficial impact to wild horses.

8.3.9.3 Ecologically Significant Areas

Damage due to trampling and erosion would continue, slightly reducing the ecologic value of some of the areas.

8.3.10 Socioeconomic Conditions

The initial economic and social impacts would be essentially the same as those described in Chapter 3. Livestock earnings would be approximately $384,000. Based on 1974 average annual livestock earnings, this would initially support the full-time equivalent of 33 jobs, 5 less than at present. Indirect income from the livestock earnings would amount to an additional $120,000 annually.

8.4 IMPLEMENT ONLY COST-EFFECTIVE AMPS

ALTERNATIVE NO. 4

Of the 68 AMPs described in the proposed action, 47 have a benefit-cost (B/C) ratio greater than 1:1. In this alternative only the 47 cost-effective AMPs would be implemented. Forage allocation, grazing systems and range improvements for this alternative are shown on Table 8-1. Fences needed for restrictive use would be constructed in Allotments 5511 and 5105.

The 21 AMPs with negative B/C ratios listed in Table 8-6 would continue to be managed the same as Alternative No. 3. New range improvements identified for these 24 allotments as shown in Table 1-6 would not be constructed.

8.4.1 Vegetation

On allotments with positive B/C ratios, the combination of forage allocation, grazing systems and range improvements would increase plant vigor and the percent composition of desirable plants the same as the proposed action. Range condition would improve to 260,274 acres in good condition, 130,440 acres in fair condition, and no acres in poor condition. Livestock forage production would increase by 10,528 AUMs, the same as in the proposed action. Riparian vegetation would respond the same as under Alternative No. 3. An additional 3,300 acres proposed for restrictive use by livestock would also show an increase in riparian vegetation.

On allotments with negative B/C ratios, impacts on range condition, livestock forage production, and persistent ground cover would be the same as Alternative No. 3.

For the ES area as a whole, range condition, livestock forage production, and persistent ground cover would increase slightly.

Table 8-6

AMPs with Negative Benefit-Cost Ratios

Allotment Number	Allotment Name	Acres Public Land
5102	Prather Creek	1,025
5108	Little Cow Creek	2,777
5201	Coleman Creek	2,900
5205	Venator	2,589
5207	Coyote Creek	1,077
5211	Beckly Home	1,494
5301	Princeton	18,288
5303	Dry Lake	34,729
5501	East Fork Cow Creek	2,504
5503	Pine Creek	18,845
5506	Muddy	4,128
5507	Wolf Creek	870
5510	Jones Dripp Springs	762
5513	Shelly and FFR	5,343
5514	Coal Mine Creek	4,577
5529	House Butte	26,104
5530 1/	River	19,652
5534	Mahan Creek	2,545
5536	Alder Creek	29,949
5537	Buck Mountain	14,719
5538	Riverside	14,191
5564 1/	Wheeler Basin	4,981
5565 1/	Upton Mountain	13,407
5566 1/	Texaco Basin	10,712
		238,168

1/ These allotments are included in one AMP (River AMP).

8.4.2 Soils

Soil erosion, as measured by erosion condition classes, would decrease to the same levels as the proposed action on allotments with positive B/C ratios (299,722 acres in stable, 90,766 acres in slight, and 325 acres in moderate erosion condition class). Streambank erosion would decrease the same as in Alternative No. 3. An additional 6.6 miles of stream would be fenced to restrict livestock grazing, which would help stabilize streambanks.

On allotments with negative B/C ratios, soil erosion and streambank erosion would be the same as under Alternative No. 3.

For the ES area as a whole, soil erosion and streambank erosion would decrease slightly.

8.4.3 Water Resources

Runoff and coliform contamination would decrease slightly and sediment yield would moderately decrease (the same as the proposed action) on cost-effective allotments. A short-term increase in sediment yield of about 2 percent above the present sediment yield of 227.4 acre-feet per year would occur due to construction of range improvements.

On allotments with negative B/C ratios, impacts on runoff, sediment yield, and coliform contamination of water would be the same as with Alternative No. 3.

For the ES area as a whole, runoff, sediment yield, and coliform contamination of water would decrease slightly.

8.4.4 Wildlife

8.4.4.1 Mule Deer and Pronghorn Antelope

Forage allocation would be slightly beneficial as discussed in Chapter 3 (Table 3-9). Initial allocation would result in substantial short-term cattle reductions on 151,000 acres of big game ranges (Figures 2-7, 2-8). The projected allocation would maintain reduced competition and increased food availability in the long term.

Changing existing grazing systems to deferred rotation or rest rotation would increase forage and benefit big game on 25,000 acres (Tables 1-3, 3-9). Twenty-one existing systems, when combined with forage allocation, would increase big game forage on 100,000 acres. Unchanged deferred and continuous systems on 91,000 acres would continue to have adverse impacts (Table 8-6). Livestock use during the same season each year with deferred and continuous grazing would increase competition as desirable browse productivity decreased.

New reservoirs would increase forage competition by allowing cattle to graze in areas previously used primarily by big game, resulting in moderate reductions of forage for big game. These new water sources would reduce livestock use at existing waters, which would slightly increase forage. Seedings would be slightly beneficial by increasing the availability of grass and sweetclover during late spring when annuals become dry.

This alternative would result in moderate deer population increases and slight antelope increases.

8.4.4.2 Beaver

Exclusion of livestock from Smyth Creek and parts of Stinkingwater Creek would improve food as described in Chapter 3 (Figure 2-9, Table 1-8). Beaver would maintain or increase their populations on public lands.

8.4.4.3 Waterfowl

Dry Lake would continue to be grazed with a deferred rotation system; nesting cover and food would remain in its present poor/fair condition. Livestock exclosures at Mahon Reservoir, Warm Springs Reservoir, House Butte Reservoir and two unnamed reservoirs in Allotment 5529 would greatly improve nesting cover and food (Figure 2-9, Table 1-8).

Proposed reservoirs would improve habitat slightly by providing new nesting and feeding areas as described in Chapter 3. Seedings would improve habitat slightly for geese by providing additional feeding areas. Annual waterfowl production would be expected to increase from the present 400 birds to over 500.

8.4.4.4 Sage Grouse

Initial and projected forage allocation would benefit sage grouse through slightly improved nesting success and increased forb availability (Figure 2-8, Table 3-9).

Continuous grazing on 25,000 acres would be replaced with deferred rotation and rest rotation, slightly improving nesting habitat (Table 1-3). Unchanged continuous grazing on 144,000 acres would continue to have adverse impacts on nesting success and brood survival. Most upland meadows in the ES area would continue to be in poor condition for sage grouse.

Reservoirs would benefit sage grouse by making more areas available to them during dry periods. Spring developments would be adverse because of overall losses of meadow vegetation.

Overall, sage grouse populations may increase slightly in response to minor improvement of habitat.

8.4.4.5 Valley Quail

Impacts would be nearly the same as Alternative No. 3. Nesting habitat and winter cover would improve greatly along 30 stream miles (Table 3-9, Figure 2-4). Habitat along 45 stream miles would remain in poor or fair condition. Overall, nesting success and winter populations would increase slightly.

8.4.4.6 Nongame Wildlife

Increased vegetation resulting from forage allocation would be slightly beneficial as discussed in Chapter 3.

Proposed replacement of continuous grazing system with deferred rotation and rest rotation would be moderately beneficial by increasing residual vegetation on about 25,000 acres. Adverse impacts (reduced residual vegetation for cover) from unchanged continuous grazing (144,000 acres) would be lessened by limiting livestock utilization of key species to 50 percent. Other existing systems would be slightly beneficial by improving residual cover and perennial grasses on 88,000 acres. Livestock exclosures, restrictive use, rest rotation and early use would improve riparian vegetation along 30 miles of perennial streams, greatly increasing cover for nongame species (Tables 1-4, 1-8; Figure 2-4).

Remaining riparian vegetation along 45 miles of perennial stream would continue to be heavily used by livestock. Habitat would remain in generally poor/fair condition. Critical habitat associated with meadows, undeveloped springs, and existing reservoirs would remain in generally poor condition. These areas are heavily used under any grazing system.

Loss of meadow vegetation at spring developments would be slightly adverse as discussed in Chapter 3. Reservoirs would be slightly beneficial by increasing animal distribution. Brush control on 800 acres would reduce food, cover and nesting sites as described in Chapter 3.

Conclusion

Increased vegetation, improved riparian areas, and new reservoirs would improve habitat. Spring developments, continuous grazing, and heavy use of vegetation at concentration areas (streams, springs, meadows, reservoirs) would have adverse impacts. Overall, conditions would improve slightly resulting in increased distribution and numbers of most species.

8.4.4.7 Fish

Fish in all streams would be slightly benefited through decreased runoff and sediments as described in Chapter 3 (Table 3-9, Figure 2-9). Restrictive use and livestock exclosures would greatly improve fish habitat along 16 miles of public stream as described in Chapter 3 (Tables 1-4, 1-8). Fish habitat would continue in mostly poor/fair condition along the remaining 16 public stream miles as a result of heavy livestock use and severe bank trampling by cattle.

Conclusion

Slight increases in fish production are expected on 16 miles of streams which would improve one condition class. Heavy cattle use along remaining 16 public stream miles would result in static or decreasing populations.

8.4.5 Recreation

While this alternative would be slightly beneficial to recreation resources, existing or projected use would not significantly change. Approximately 7.5 miles of fencing in rock and mineral collecting area would slightly interfere with recreation movement. Ten miles of proposed fences in snowmobile use areas would pose a slight safety hazard and inconvenience.

Improved fish habitat would slightly increase fishing opportunities. Increasing wildlife populations would enhance wildlife sightseeing opportunities in some areas.

8.4.6 Cultural Resources

Damage to cultural resources from livestock trampling and erosion would not differ from the existing situation. Some disturbance of unidentified sites from range improvements may occur.

8.4.7 Visual Resources

VRM class objectives would be more easily met. Brush control, if accomplished by herbicide spraying, would leave 800 acres of dead sagebrush in an unesthetic condition.

8.4.8 Wilderness Values

Impacts to designated wilderness study areas would be the same as in the proposed action. Less evidence of human activity and interference would be apparent in those allotments where no new range improvements are completed. Proposed range improvements and grazing systems would be subject to the wilderness guideline constraints. No significant impacts are anticipated.

8.4.9 Land Use

8.4.9.1 Livestock Grazing

Initially, livestock grazing would decrease by 8,442 AUMs. The expected increase in forage production would increase the projected allocation to 73,437 AUMs, which is 2,911 AUMs less than the present level of livestock grazing.

8.4.9.2 Wild Horses

On allotments with positive B/C ratios, there would be some disturbance of horses caused by project construction activities. Better distribution of horses due to the 43 new water developments as well as reduced forage competition between livestock and wild horses would be moderately beneficial.

On allotments with negative B/C ratios, the impacts on wild horses would be the same as Alternative No. 3. Cumulative impacts from this alternative would be slightly beneficial.

8.4.9.3 Ecologically Significant Areas

Damage due to trampling and erosion would continue to occur, reducing ecologic values to a slight extent.

8.4.10 Socioeconomic Conditions

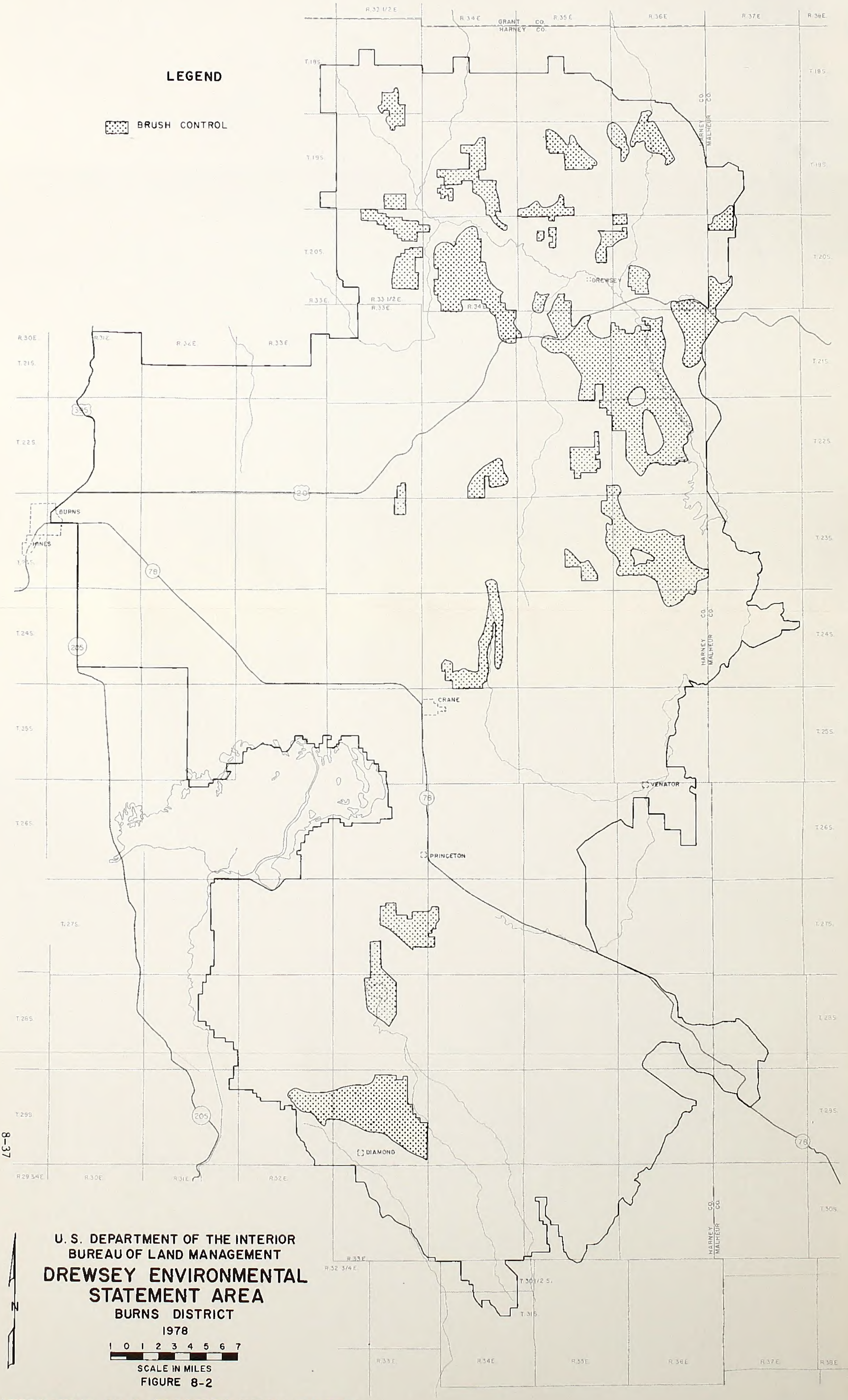
Since economic impacts depend on the livestock forage allocation, the impacts of this alternative would be essentially the same as those of the proposed action. About 10 percent of the permittees would have a significant change in livestock forage dependency. Direct earnings from livestock production would decline about $48,000 and employment would decline by the full-time equivalent of 5 jobs. The impacts on individuals would depend on the permittee's adaptability and the response of other permittees to this alternative.

8.5 OPTIMIZE ALLOCATION OF FORAGE TO LIVESTOCK

ALTERNATIVE NO. 5

This alternative would provide for both a lower initial and a higher long-term level of livestock use than the existing situation. This increased use would be achieved by implementing the proposed action with the exception that no forage allocation would be made to wildlife and visual/primitive values, only 360 AUMs would be allocated to wild horses and 5,706 AUMs to watershed protection. Fences needed to restrict livestock use as shown in Table 1-4 would be constructed. An additional 173,648 acres of sagebrush control would be completed by spraying 2,4-D herbicide or brush beating allowing for increased forage production. It is expected that most sagebrush control would be accomplished with herbicides since rocky terrain makes the use of brush beating machinery impractical. Refer to Table 8-7 and Figure 8-2 for allotments and acres affected by sagebrush control. The six wild horse herds would be reduced to one herd of a maximum 30 animals in East Kiger Allotment 5308.

Implementing this alternative would initially provide 73,101 AUMs forage for livestock grazing, 3,247 AUMs less than the existing situation.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

1978

SCALE IN MILES

FIGURE 8-2

ALTERNATIVE NO. 5 - PROPOSED BRUSH CONTROL

Table 8-7

Allotments Affected and Acres of Sagebrush Control to be Completed to Optimize the Forage Allocation to Livestock

Allotment Name & Number		Sagebrush Control Acreage
5101	Devine Ridge	1,500
5102	Prather Creek	193
5103	Lime Kiln	1,744
5105	Camp Harney	400
5203	Catterson	400
5205	Venator	2,000
5207	Coyote Creek	1,077
5208	Emmerson	1,500
5212	Mahan Ranch	2,399
5213	Beaver Creek	6,000
5214	Hamilton	2,000
5215	Davies	2,000
5301	Princeton	2,480
5302	Big Bird	640
5303	Dry Lake	21,164
5307	Smyth Creek	1,500
5308	East Kiger	2,000
5309	Happy Valley	1,000
5313	Burnt Flat	6,000
5314	Summit Springs	1,485
5315	So. Fork Malheur	7,000
5316	Virginia Valley	5,632
5503	Pine Creek	5,682
5505	Little Muddy	2,440
5506	Muddy	4,108
5507	Wolf Creek	460
5509	William Dripp Spr.	845
5510	Jones Dripp Spr.	757
5511	Moffett Table	5,286
5513	Shelly	3,025
5514	Coal Mine Creek	1,000
5515	Mule Creek	402
5516	Birch Creek	1,340
5517	Otis Mountain	2,000
5522	Cottonwood	5,427
5524	Tub Springs	1,335
5525	Mill Gulch	640
5526	Chalk Hills	1,550
5527	Drinkwater Summit	1,710
5528	Cooler	2,455
5529	House Butte	12,038
5530	River	12,995
5531	Stinkingwater	2,642
5532	Mountain	9,511
5533	Buchanan	792
5534	Mahan Creek	525
5535	Miller Canyon	3,000
5536	Alder Creek	11,520
5537	Buck Mountain	6,435
5538	Riverside	2,814
5541	Wilber	800

Total Sagebrush Control: 173,648 acres

In the long term, this alternative is expected to provide 107,536 AUMs livestock forage, 31,188 AUMs more than the existing situation.

8.5.1 Vegetation

Increases in plant vigor and percent composition of desirable plants would occur from the combination of forage allocation, grazing systems and range improvements about the same as the proposed action, except for brush control areas. Under this alternative, 184,507 acres of big sagebrush would be destroyed. For the purpose of analysis, it is assumed that the entire 184,507 acres would be sprayed with 2,4-D. Based on past brush control projects, approximately 90 percent of the sagebrush would be eliminated, as well as any other broad leaved woody and herbaceous plants in the same growth stage (for a list of plants impacted by 2,4-D, see Table 3-3).

Crested wheatgrass would be seeded on 10,859 acres that are dominated by big sagebrush and have very few understory species. The remaining 173,648 acres have understory species; since sagebrush control would leave more soil moisture, these species (primarily grasses that were not killed by the herbicide) would increase. Since a minimum 100 foot buffer strip would be left on each side of perennial streams, riparian vegetation would not be impacted.

Most of the annual herbaceous species would normally reappear the following year since an adequate seed source would be available on adjacent untreated areas. Reestablishment of the woody species would be slow (10 to 50 years). An increase in herbaceous plants on the treated areas would cause range condition and forage production to improve on the 184,507 acres.

Riparian vegetation would increase the same as under Alternative No. 3. Riparian vegetation would also increase on 2,600 acres proposed for restrictive use by livestock.

Over the long-term, this alternative would result in a major improvement in range condition, a moderate increase in vegetative ground cover, and 31,188 more AUMs of forage production than the present situation. Some overgrazing would occur on wildlife concentration areas, since no livestock AUMs would be allotted to wildlife.

8.5.2 Soils

Proposed forage allocation for this alternative would result in more vegetation left ungrazed at the end of each growing season. This increase in ground cover would cause soil erosion to decrease to about the same level as under the proposed action (494,800 acres in stable erosion condition class; 129,100 acres in slight; 2,500 acres in moderate; and no acres in critical or severe condition class).

Streambank erosion would continue on allotments with continuous, deferred, deferred rotation, and rotation grazing systems (466,000 acres of public land). On 170,000 acres with early and rest rotation grazing, and along 22 miles of perennial streams with restricted or no livestock grazing, riparian vegetation would increase and streambank erosion would decrease, the same as the proposed action.

8.5.3 Water Resources

With better distribution of livestock due to the 339 proposed water developments, coliform contamination of water would decrease. The increase in ground cover would cause runoff and sediment yield to decrease about the same as under the proposed action. Construction of range improvements would cause a short-term increase in sediment yield of 14 acre-feet per year. In the long term, sediment yield would decrease to 179 acre-feet per year from public lands in the ES area.

For the purpose of analysis, it is assumed that the entire 184,507 acres proposed for brush control would be sprayed with 2,4-D. The herbicide could get into streams from either overland flow of water or direct application onto the surface of water. Approximately 15 miles of perennial streams are within the area proposed for spraying. However, by leaving a minimum of 100 feet on both sides of all perennial streams unsprayed, there would be little or no direct application of 2,4-D to water. Most of the herbicide that is removed from the treated area by overland flow of water would be adsorbed by the soil in the buffer strip, so that little of the herbicide would enter perennial streams. Therefore, little of the herbicide would contaminate water in the area.

8.5.4 Wildlife

8.5.4.1 Mule Deer and Pronghorn Antelope

Initial forage allocation would reduce forage competition, slightly benefiting deer and antelope (Figures 2-7, 2-8). The projected increase of 34,435 AUMs for livestock would increase competition for desirable shrubs resulting in moderately decreased forage.

New grazing systems would be slightly beneficial by increasing forage as described in Chapter 3 (Table 3-9). Existing grazing systems with initial allocation would increase forage slightly in the short term. Existing grazing systems with projected allocation would decrease big game forage with moderately adverse, long-term impacts.

Sagebrush control would have major adverse effects on deer by reducing forage and cover. Antelope would be moderately benefited because they are adapted to open areas which allow free movement. If the proposed 184,507 acres of sagebrush control is accomplished by spraying 2,4-D, deer and antelope would

lose desirable forbs. Standing dead brush would discourage antelope use for 3-5 years. Leave strips could be accidently sprayed because of wind drift and overlap. The most important food and cover could be lost.

Brush beating would eliminate standing sagebrush and benefit antelope immediately. Desirable forbs would not be lost. Leave strips could be precisely located because treated areas are easily distinguished from untreated areas. Important food and cover would be protected.

Seedings of 32,782 acres would improve spring forage, slightly benefiting big game.

New reservoirs would increase forage competition by allowing cattle to graze in areas previously used primarily by big game, resulting in moderately decreased forage. These new water sources would increase big game distribution and reduce livestock use at existing waters, which would slightly increase forage.

Conclusion

Due to forage and cover losses, mule deer carrying capacity would be moderately reduced. Improved habitat for antelope would allow for slight increases.

8.5.4.2 Beaver

Exclusion of livestock from Smyth Creek and parts of Stinkingwater Creek would improve food as described in Chapter 3. Beaver would maintain or increase their populations on public lands.

8.5.4.3 Waterfowl

Exclosures at five reservoirs and the new rest rotation system at Dry Lake would greatly improve nesting cover and food as described in Chapter 3.

Proposed reservoirs and seedings would improve habitat as described in Chapter 3. Reservoirs would increase habitat slightly by providing new nesting and feeding areas. Seedings would slightly increase food for geese. Annual waterfowl production would increase from the present 400 birds to over 1,250.

8.5.4.4 Sage Grouse

Initial forage allocation with relatively minor reductions would not have a significant impact on sage grouse. Increased nest disturbance from projected allocation would have a moderate adverse impact (Figure 2-8).

Sage grouse would be slightly benefited by grazing systems that provide improved meadows and nesting cover as described in Chapter 3.

Removal of sagebrush from 184,507 acres would greatly reduce food and cover for sage grouse (Table 8-7). Spraying would reduce desirable forbs in addition to sagebrush. Brush beating would not reduce forbs. Reservoirs would slightly benefit sage grouse by making more areas available to them during dry periods. Spring developments would be slightly adverse because of overall losses of meadow vegetation.

This alternative would be severely adverse to sage grouse. The present low numbers would be expected to decline further.

8.5.4.5 Valley Quail

Impacts to quail would be nearly the same as the ones outlined in Chapter 3 (Table 3-9). Grazing exclusion and restrictive use would greatly improve winter cover on 22 stream miles (Tables 1-4 and 1-8). Rest rotation and early grazing would moderately improve winter cover on 14 stream miles. Winter cover would not improve from its present poor condition along 37 stream miles with continuous, deferred and deferred rotation systems. Overall improved habitat is expected to increase winter populations and nesting success.

8.5.4.6 Nongame Wildlife

Projected livestock forage allocation would increase nest disturbance with moderately adverse impacts. Heavy use in concentration areas (streams, springs, meadows, and reservoirs) would be increased, with moderate adverse impacts.

Proposed replacement of continuous grazing system with deferred rotation and rest rotation systems would increase residual vegetation on about 90,000 acres with slightly beneficial impacts. Adverse impacts from unchanged continuous systems (83,558 acres) would be lessened by limiting livestock utilization of key species to 58 percent. Critical habitat associated with streams, meadows, springs, and existing reservoirs would remain in generally poor condition. These areas are heavily utilized under any system.

Sagebrush control on 184,507 acres using either herbicides or brush beating would greatly reduce food, cover and nesting sites. Spraying would further reduce food by reducing forbs. Drift may result in important food and cover patches being sprayed. Brush beating would not have a significant impact to forbs. Important food and cover patches can be precisely located and easily avoided with brush beating.

Spring developments would be adverse because of overall losses of meadow vegetation. Increased distribution of water from new reservoirs would increase distribution and numbers of species.

Conclusion

Vegetation changes and projected livestock increases would reduce some species (e.g., least chipmunk, horned lizard) and increase others (e.g., horned lark, lark sparrow). However, overall population and distribution of nongame animals are expected to be reduced.

8.5.4.7 Fish

Fish in all streams would be slightly benefited through decreased runoff and sediments as described in Chapter 3 (Figure 2-9, Table 3-9). Restrictive use and livestock exclosures would greatly improve fish habitat along 22 miles of public stream (Tables 1-4, 1-8).

Slight increases in fish production are expected. Fish habitat would continue in mostly poor/fair condition along the remaining 10 public stream miles as a result of heavy livestock use and severe bank trampling by cattle. Fish populations would be static or decrease.

8.5.5 Recreation

Increased vegetative manipulation would lower the quality of sightseeing experiences. Existing and projected visitor use would decrease slightly. Fewer opportunities would be available to view wild horses and wildlife. Slight decreases in wildlife populations would not significantly affect hunting opportunities. Other impacts would be the same as under the proposed action.

8.5.6 Cultural Resources

Vegetative manipulation (i.e., sagebrush control) would slightly increase vehicular disturbance of cultural resources. Impacts from other range improvements and livestock grazing would be the same as described in Chapter 3 and could result in artifact damage or disturbance.

8.5.7 Visual Resources

The impacts of sagebrush control would be significant, occurring on 184,507 acres. Great visual contrasts would be expected under this alternative. Potential adverse impacts to visual resources in the foreground-middleground of VRM Class II and III areas would be expected.

8.5.8 Wilderness Values

There would be no change from the existing situation.

8.5.9 Land Use

8.5.9.1 Livestock Grazing

Livestock grazing would continue as a major land use on public and private lands. This alternative would implement the AMPs described in the proposed action and would allow an initial level of livestock use of 3,247 AUMs less than the present situation. The long-term projected allocation for livestock under this alternative would be 31,188 AUMs more than the present situation.

8.5.9.2 Wild Horses

Five out of six wild horse herds would be eliminated. The remaining Kiger herd would be managed at the maximum level of 30 horses described in the proposed action. Forage competition between horses and cattle within the herd management area would be reduced due to the allocation of 360 AUMs to horses.

8.5.9.3 Ecologically Significant Areas

Increased vegetative manipulation may degrade the quality of some ecologically significant areas. Some areas with ecological values related to wildlife may be impacted insofar as decreases in wild horses and wildlife are expected.

8.5.10 Socioeconomic Conditions

Although fewer AUMs would be allocated initially, this alternative would allow permittees to maintain larger herds in the long term. For the short term, local direct livestock earnings would be an estimated $413,000 and local indirect earnings would be about $12,000. This would support an estimated direct livestock employment of about 36 which is 2 jobs fewer than the existing situation.

Dependency analysis for the long term cannot be computed because no determination has been made as to which permittee would receive increases in AUMs. Consequently the total change in livestock AUMs allocated to each permittee is unavailable.

Generally this alternative would be perceived as improving the social welfare of local residents, especially ranchers. It would probably be viewed as a reverse of a perceived trend toward removal of livestock grazing from public lands.

Adverse reactions would be noted from environmentalists and wildlife and wild horse enthusiasts. Environmentalists would disapprove of the use of chemicals and the negative impacts on the environment caused by increased livestock grazing.

8.6 NO ACTION

ALTERNATIVE NO. 6

This alternative constitutes a continuation of the present situation. There would be no change from present management conditions. Grazing licenses would continue to be issued at present levels of use. As shown in Table 1-2, initial forage allocation for livestock would be 76,348 AUMs. For purposes of impact analysis, it is assumed that no additional AMP implementation or range improvement projects would be undertaken during the long-term analysis period (15 years). Fences needed for restriction of livestock use (Table 1-4) would not be constructed. Wild horse numbers would be maintained at a maximum of 330 head by periodic control actions on five herd management areas, the same as the proposed action.

In the present situation no specific livestock forage allocation is made for wildlife, watershed or wild horse needs. Of the total 79,167 AUM carrying capacity, 2,819 AUMs not used by livestock would be available to partially satisfy the total need of 11,261 AUMs.

8.6.1 Vegetation

Overgrazing would occur on allotments identified for a livestock reduction in Table 1-2 (316,000 acres). Plant vigor and percent composition of desirable plants would decrease on those overgrazed allotments, and on concentration areas on the 179,217 acres under the continous grazing system. This would result in a slight decrease in vegetative ground cover and range condition, and no increase in livestock forage production. On allotments properly stocked and with grazing systems other than continuous, plant vigor and percent composition of desirable plants would increase slightly, resulting in an increase in ground cover, range condition, and forage production. For the ES area as a whole, ground cover and range condition would decrease slightly and forage production would remain at the present level.

Riparian vegetation would remain in poor condition on allotments with grazing systems other than early or rest rotation, and would improve on the allotments with these systems and on the 2,600 acres to be fenced, as described in Alternative No. 3.

8.6.2 Soils

With the present level of livestock use, ground cover would increase slightly on allotments that are presently stocked at their carrying capacity and have grazing systems other than continuous grazing. Ground cover would remain the same or decrease slightly on the 179,217 acres under continuous grazing, and the approximately 316,000 acres in allotments that are presently overstocked. On the latter, 46,780 acres are presently in the moderate, critical or severe erosion condition class (SSF greater than 41). Most of these acres are on

highly erodible lacustrine soils, and represent 83 percent of the total acres with an SSF of 41 or more. For the ES area as a whole, erosion would increase slightly. Streambank erosion would be the same as under Alternative No. 3.

8.6.3 Water Resources

Coliform contamination of water and runoff would remain at about the same levels as the present situation. Sediment yield would remain about the same or decrease slightly on allotments that are properly stocked (320,500 acres), and would increase slightly on allotments that are presently being overgrazed (316,000 acres).

8.6.4 Wildlife

8.6.4.1 Mule Deer and Pronghorn Antelope

Forage competition would increase as desirable browse productivity decreased, with moderately adverse impacts on deer. Carrying capacity for deer would decrease, especially on winter ranges (Figure 2-7). Antelope habitat would remain in generally good condition (Figure 2-8). Moderate forage competition with cattle would occur in areas of fair or poor range condition such as Allotment 5531. Antelope would increase slightly to ODFW goal populations.

8.6.4.2 Beaver

Exclusion of livestock from Smyth Creek and parts of Stinkingwater Creek would improve food as described in Chapter 3 (Figure 2-9, Tables 1-8 and 3-9). Beaver would maintain or increase their populations on public lands.

8.6.4.3 Waterfowl

Impacts would be the same as Alternative No. 3. Dry Lake would remain in poor/fair condition. Livestock exclosures at five reservoirs would greatly improve nesting habitat and food. Annual waterfowl production would be expected to increase from the present 400 birds to over 500.

8.6.4.4 Sage Grouse

Sage grouse populations would be expected to remain low. Heavy livestock utilization at springs and meadows would continue to have moderately adverse impacts; forage for broods would be reduced.

8.6.4.5 Valley Quail

Impacts would be the same as Alternative No. 3. Winter cover, nesting habitat and food would improve greatly along 26 stream miles (Figure 2-4). Habitat would remain in poor or fair condition along 49 stream miles. Winter populations and nesting success would increase slightly.

8.6.4.6 Nongame

Livestock exclosures, early grazing and rest rotation would improve approximately 150 acres of riparian vegetation. Food and cover would be moderately increased. Continued poor condition of 580 riparian acres at streams, springs and reservoirs would provide little food and cover in these critical areas. Decreased residual cover and plant vigor on about 316,000 acres would moderately reduce nesting cover, thermal cover and food. Species distribution and numbers would decline slightly, especially at concentration areas (streams, undeveloped springs and reservoirs).

8.6.4.7 Fish

Increased runoff and sediments would deteriorate fish habitat especially in areas with poor riparian vegetation. Livestock exclosures (Table 1-8) and rest rotation in Allotment 5105 would improve 12 miles of fish habitat one condition class as described in Chapter 3 (Table 3-9). Slightly increased fish production is expected.

Twenty public stream miles would remain in generally poor/fair condition with downward trend (Table 2-10). Carrying capacities would be moderately decreased. Game fish in at least 4 miles of public stream would probably be eliminated in the long term. Overall, there would be a slight decrease in fish production.

8.6.5 Recreation

Continuation of the present situation would result in degradation of resources directly related to high-quality recreation. For example, vegetative decline would lower the area's esthetic qualities and result in lower quality sightseeing opportunities. Decreases in wildlife would limit wildlife sightseeing opportunities. It is anticipated that existing and projected recreational use would not significantly change.

8.6.6 Cultural Resources

Impacts to cultural resources would be of the same kind as those identified in Chapter 3. Unidentified sites would be subject to some artifact disturbance, breakage and/or alteration.

8.6.7 Visual Resources

This alternative would result in forage depletion in areas of heavy grazing. Changes in color, texture, and pattern would be expected. Vegetative contrasts would make it more difficult to meet VRM class objectives.

8.6.8 Wilderness Values

The impacts to wilderness values would be the same as under the proposed action. Proposed range improvements and grazing systems would be allowed only if they do not impair an area's suitability for wilderness. Wilderness inventory and analysis procedures would continue unaffected.

8.6.9 Land Use

8.6.9.1 Livestock Grazing

Livestock grazing would continue at the present level of 76,348 AUMs. Continued heavy use of vegetation would cause deteriorated condition and downward trend of the range in allotments that are presently overstocked with a resultant decline in livestock forage production.

8.6.9.2 Wild Horses

Forage competition between livestock and wild horses would continue. Overall, forage competition would be similar to the present situation.

8.6.9.3 Ecologically Significant Areas

Increased trampling and site erosion may be more noticeable in some areas, causing a slight reduction in ecologic value.

8.6.10 Socioeconomic Conditions

It is assumed that any future changes in livestock production would result primarily from changes in market conditions and not changes in livestock forage allocation. Direct livestock earnings attributable to grazing on public lands would approximate $430,000 annually. Little change is expected in the structure of ranch earnings and livestock products would continue to contribute a majority of all agricultural income within Harney County. Social attitudes identified in Chapter 2 would be expected to intensify.

CHAPTER 9

Coordination and Consultation

9

9. CONSULTATION AND COORDINATION

Throughout the planning process and proposal development, public input was sought through various means. The Burns District made contact dealing with the management framework plan with local groups and officials. Public meetings were held in Burns and Portland. A full record of all public participation is available for review in the Burns District Office.

Primary documents utilized in writing this environmental statement were the planning system sections prepared in the Burns District. Preparation of this statement was undertaken by a team of specialists in the Oregon State Office of BLM. Specialties represented on the team or available for consultation included range, wildlife, soils, watershed management, forestry, hydrology, geology, recreation, sociology, economics, fisheries and archeology.

During preparation of the DES, other State and Federal agencies, as well as universities with special expertise relating to the proposed action, were contacted for information. Records of contacts are on file in the Oregon State Office.

Public media, government, and private agencies were the recipients of information documents dealing with the environmental statement. These included news releases and copies of the preparation plan. Oregon media coverage consisted of four daily newspapers, one weekly paper, seven television stations, and three radio stations.

The original preparation plan was made public August 26, 1976 and this mailing list consisted of:

--Two U.S. senators and four representatives

--Ten Federal agencies or bureaus

--The governor of Oregon, 4 legislators, and 13 State agencies

--Thirteen units of local government at city, county, and district level

--Advisory groups, most notably the Burns District Advisory Board and the Oregon Multiple Use Board

--Institutional, professional and intergovernmental agencies, chambers of commerce

--Seven lumber and timber industry organizations and companies

--Five organizations with mining interests

--Six livestock and agricultural industry associations

--Three utility companies

--Eight universities or colleges

--Twenty-five groups with an interest in the conservation of the natural environment

--All grazing permittees in the Drewsey ES area

--Known mining claimants (11)

Comments on the DES will be requested from the following agencies and interest groups:

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
- Forest Service
- Soil Conservation Service

Department of Defense
- U.S. Army Corps of Engineers

Department of Energy
- Region X

Department of the Interior
- Fish and Wildlife Service
- Geological Survey
- Heritage Conservation and Recreation Service
- Bureau of Mines
- Bureau of Reclamation

Environmental Protection Agency

State and Local Government

Oregon State Clearinghouse
Oregon State Historic Preservation Officer
Harney County Planning Commission
IDA-ORE Regional Planning and Development Association

Interest Groups

American Horse Protection Association
American Society of Range Management
Desert Trails Association
Harney County Stockgrowers Association
League of Women Voters
National Resource Defense Council
National Wildlife Federation
Oregon Cattlemen's Association
Oregon Environmental Council
Oregon High Desert Study Group
Oregon Natural Heritage Program
Oregon Student Public Interest Research Group
Oregon Sheepgrowers
Pacific Northwest Four-Wheel Drive Association
Public Lands Council
Sagecountry Alliance for a Good Environment (SAGE)
Sierra Club
Southern Oregon Resource Alliance (SORA)
The Wilderness Society
Warm Springs Irrigation District
Wildlife Management Institute
Wildlife Society, Oregon Chapter

Copies of this draft environmental statement will be available for public inspection at the following BLM offices:

Washington Office of Public Affairs
18th and C Streets
Washington, DC 20240
Phone (202) 343-5717

Oregon State Public Affairs Office
729 NE Oregon Street (P.O. Box 2965)
Portland, Oregon 97208
Phone (503) 231-6277

Burns District Office
74 South Alvord
Burns, Oregon 97720
Phone (503) 573-2071

Reading copies will be placed in the following libraries: Central Oregon Community College, Bend; Portland State University, Portland; Oregon State University, Corvallis; University of Oregon, Eugene; and the Harney County Library, Burns.

Public hearings will be held in Burns and Portland, Oregon, on the adequacy, completeness, and accuracy of this environmental statement. The hearings will not address the advantages or disadvantages of the proposed action, but opinions are and will be solicited on the quality of the analysis.

Details of the hearing will be published in the Federal Register and local news sources.

Appendices

App.

Appendices

A. AMP Objectives.

B. Methodologies.

C. AMP Monitoring Procedure.

D. Soil Mapping Unit Acreages.

Soil Units Shown on Figure 2-2 General Soils Map.

Properties and Qualities of the Soils in the Drewsey ES area.

E. Scientific Names of Plants Mentioned in the ES.

F. Prehistoric Sites.

G. Discussion of Impacts on Vegetation for Selected Allotments

Appendix A

AMP Objectives

Allotment Name & Number	Livestock	Wildlife	Watershed	Vegetation - Soil Erosion
5101 Devine Ridge	Increase vigor of key species from low to high. Provide forage for early spring turnout.	Maintain present browse production in critical deer winter range.		Increase ground cover of needlegrass, bluebunch wheatgrass and squirreltail from 5 to 15% in south pasture; increase Sandberg bluegrass, squirreltail and Idaho fescue from 4 to 13% in north pasture.
5102 Prather Creek	Produce 40 AUMs of forage.	Provide 6 months of forage for 50 head of mule deer.	Maintain soil surface factors (SSFs) in Slight class.	
5103 Lime Kiln	Provide carryover forage to allow for April 16 turnout.	Maintain present stands of bitterbrush, big sagebrush, and Mtn. mahogany on critical deer winter range.		Increase ground cover of bluebunch wheatgrass, Sandberg bluegrass, Idaho fescue and squirreltail from 3 to 15% on deep soils; increase Sandberg bluegrass from 1 to 5% on shallow soils.
5104 Soldier Creek	Provide carryover forage to allow for April 16 turnout.	Maintain present stands of bitterbrush, big sagebrush, and Mtn. mahogany on critical deer winter range.		Increase ground cover of bluebunch wheatgrass, Sandberg bluegrass, Idaho fescue and squirreltail from 3 to 15% on deep soils; increase Sandberg bluegrass and squirreltail from 1 to 5% on shallow soils.
5105 Camp Harney	Provide carryover forage to allow for April 16 turnout.	Maintain present stands of bitterbrush, squaw apple, and low sagebrush on critical deer winter range.		Increase ground cover of bluebunch wheatgrass, Sandberg bluegrass, Idaho fescue and squirreltail from 3 to 15% on deep soils; increase Sandberg bluegrass and squirreltail from 1 to 5% on shallow soils.
5106 Cow Creek	Provide carryover forage to allow for early turnout.	Maintain browse production for wildlife and livestock.		Increase ground cover of bluebunch wheatgrass, basin wildrye, squirreltail, sedge from 4 to 15%; on meadows increase Kentucky bluegrass and sedge from 25 to 50%.
5108 Little Cow Creek	Increase livestock forage from 397 to 463 AUMs; improve range condition from fair to good.	Increase livestock type forage for wildlife from 8 to 15 AUMs.		Increase forage available for watershed protection from 63 to 72 AUMs.
5201 Coleman Creek	Increase cow forage production from 250 to 525 AUMs to satisfy Class I qualifications.	Provide forage and cover for a maximum of 1,000 deer for one to three months in the winter.		Reduce bare ground on lower slopes from 25% to 15%.
5202-5203 Hunter-Catterson	Provide livestock forage sufficient to maintain the licensed use.	Provide forage for 140 deer in critical deer winter range; provide for 25 antelope in antelope spring-summer range.	Reduce SSFs from 27 to 23 (Hunter) and 23 to 18 (Catterson) in 10 years.	
5204 Slocum Field	Provide 300 AUMs of forage for cattle on a sustained yield basis.	Maintain or improve the deer winter range for 50 deer.	Maintain the current SSF of 21.	
5205 Venator	Increase forage production from 171 to 320 AUMs to satisfy Class I qualifications; provide carryover forage to allow for early spring turnout.	Maintain production of low and big sagebrush, bitterbrush, and shrubby buckwheat for deer winter forage.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, squirreltail, basin wildrye, Sandberg bluegrass, and needlegrass from 5 to 15% and crested wheatgrass from 3 to 20%.

5207 Coyote Creek	Increase vigor of grasses in south end of the allotment from low to moderate.			Increase ground cover of bluebunch wheatgrass, Sandberg bluegrass, squirreltail, and needlegrass from 3 to 10% on south end and maintain present 12 to 15% on rest of allotment.
5208 Emmerson	Maintain forage production for livestock at 225 AUMs.	Provide competitive livestock type forage for 90 deer.	Maintain SSF at or below Slight level.	
5209 Crane	Maintain forage production for livestock at 350 AUMs.		Maintain or improve SSF of 24.	
5210-5212-5217 Windy Point-Mahon Ranch-Thompson FFR	Maintain forage production for livestock at 384 AUMs.	Provide forage and habitat for 30 deer deer and 10 antelope.	Maintain or reduce SSFs below 20.	
5211 Beckley Home	Increase forage production to 146 AUMs in 10 years.	Provide forage and habitat for 10 deer yearlong.	Maintain SSF below 20.	
5213 Beaver Creek	Increase vigor of perennial grasses from fair to good.			Increase ground cover of bluebunch wheatgrass, squirreltail, and Idaho fescue from 5 to 20%.
5214 Hamilton	Maintain high vigor of perennial grasses; produce 245 AUMs of forage.			Increase ground cover of bluebunch wheatgrass in north pasture from 6 to 12% and from 6 to 9% in the south pasture.
5215 Davies	Produce 258 AUMs of forage.	Provide forage and habitat for 10 deer.	Maintain or reduce all SSFs below 30 within 10 years.	
5301 Princeton	Maintain forage production at 3,649 AUMs; increase production by 161 AUMs in 3 pastures.	Provide forage for 20 deer June December and 20 antelope yearlong.	Maintain SSFs below 20.	
5302 Big Bird	Maintain 418 AUMs of forage.		Maintain SSFs below 20.	
5303 Dry Lake	Increase forage production to 7,272 AUMs; maintain range conditions.	Produce forage for 52 deer and 100 antelope for winter use.	Maintain SSFs in Stable class.	
5304 Square Butte	Maintain forage productivity; maintain range conditions at "good".	Provide forage and habitat for 10 antelope yearlong.	Maintain SSFs in Stable class.	
5305 Crows Nest	Maintain 800 AUMs of forage.		Maintain SSFs below 20.	
5306 Rocky Ford	Maintain 900 AUMs of forage; maintain 10-15% wolf plant density in Rocky Ford pasture.	Maintain forage production for transient wildlife.	Maintain SSFs in Stable class.	
5307 Smyth Creek	Maintain 3,095 AUMs of forage.	Maintain forage production for 60 deer on crucial deer winter range; maintain 20 antelope yearlong.	Reduce SSFs to Slight level in 15 years.	

5308-5324 East Kiger-West Kiger	**Maintain 552 AUMs of livestock forage; maintain 360 AUMs for wild horses.**	**Provide habitat and forage on crucial deer winter range for 40 deer.**	**Maintain SSFs in Slight class.**	
5309 - 5311 - 5312 Happy Valley - Gov. Field - Deep Creek	Increase forage production to full potential in 15 years.	Provide forage on crucial deer winter range.	Maintain present SSFs.	
5310 Riddle Mtn.	Increase forage production by 281 AUMs in 10 years.	Provide forage on crucial deer winter range.	Maintain present SSFs.	
5313 Burnt Flat	Increase forage production to 4,568 AUMs;provide 600 AUMs for wild horses.	Provide habitat and forage for 90 antelope and 100 deer April to November and for 30 deer November to December.	Maintain SSFs in Slight class.	
5314 Summit Springs	Maintain forage production for 466 yearlings for 3 months each spring.	Maintain forage and habitat for 20 deer and 10 antelope April to November.	Reduce all SSFs to below 25 in 15 years.	
5315 South Fork	Maintain 3,519 AUMs livestock forage; provide 840 AUMs for wild horses.	Provide forage and habitat for 40 antelope and 40 deer yearlong.	Maintain present SSFs.	
5316 Virginia Valley	Maintain 3,653 AUMs of forage.	Maintain forage and habitat for 10 deer and 40 antelope yearlong.	Reduce all SSFs to below 25 in 10 years.	
5321 Hamilton Ind.	Maintain 143 AUMs of livestock forage; improve range condition from fair to good.			
5501 E. Fork Cow Cr.	Increase vigor of perennial grasses from moderate to high.			Increase ground cover of bluebunch wheatgrass, Idaho fescue, basin wildrye and squirreltail from 6 to 15% on deep soils; increase Sandberg bluegrass, squirreltail, Idaho fescue, and bluebunch wheatgrass from 5 to 10% on shallow soils.
5502 Rock Creek	Improve grazing pattern to 95% use; increase vigor of bluebunch wheatgrass, Idaho fescue, and squirreltail from low to high; leave old grass for spring turnout.	Maintain brush cover for forage for livestock and wildlife.		Increase ground cover of bluebunch wheatgrass from 3 to 7% and Idaho fescue from 1 to 4% in Federal Pasture. Maintain basin wildrye in north pasture at 4 to 5%.
5503 Pine Creek	Maintain 2,300 AUMs of livestock forage.	Increase livestock type forage for wildlife from 57 to 114 AUMs.		Provide forage for watershed protection.
5505 Little Muddy	Increase vigor of bluebunch wheatgrass, Idaho fescue, and squirreltail from low to high; leave old grass for spring turnout; improve grazing pattern to 95% use; lessen larkspur problem.	Improve vigor and condition of bitterbrush and squaw apple for forage for livestock and wildlife.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, squirreltail, and basin wildrye from 6 to 12% on deep soils and from 2 to 8% on shallow soils; increase bluebunch wheatgrass, Idaho fescue, and Junegrass from 8 to 20% in Mtn. mahogany-pine thicket open areas.

5506 Muddy Creek	Provide 484 AUMs of forage; reduce grazing concentration in Creek Bottom pasture.	Provide forage for 150 deer April to November.	Reduce SSFs to below 20 in 15 years.	
5507 Wolf Creek	Maintain 136 AUMs of livestock forage; maintain range in good condition.			
5508 Baker Knowles	Provide 62 AUMs of forage.	Provide forage and habitat for 20 deer April to November; limit cattle use of bitterbrush to less than 20%.	Maintain present SSFs.	
5509 William Dripp Springs	Provide 159 AUMs of forage.	Provide forage and habitat for 20 deer April to November.	Maintain present SSFs.	
5510 Jones Dripp Springs	Provide 120 AUMs of forage.	Provide forage and habitat for 10 deer yearlong.	Maintain present SSF.	
5511 Moffet Table	Increase vigor of bluebunch wheatgrass, Idaho fescue, and squirreltail from low to high; hedge squaw apple, basin wildrye.	Maintain browse production for livestock and wildlife.		Increase ground cover of bluebunch wheatgrass, squirreltail, Idaho fescue, and basin wildrye from 5 to 15-18% on deep soils; increase Sandberg bluegrass, squirreltail, Idaho fescue, and bluebunch wheatgrass from 4-5 to 10-12% on shallow soils.
5512 Clark's River	Maintain 40 AUMs of forage.		Improve SSF, condition and trend in 5 years.	
5513 Shelley	Provide 500 AUM's within 15 years; increase range condition from fair to good.	Provide forage and habitat for 80 deer in critical deer winter range.	Reduce SSFs to below 20.	Increase ground cover on big sagebrush sites to 60% or more.
5514 Coal Mine Creek	Increase forage production to 414 AUMs. Leave old grass for spring turnout.	Maintain bitterbrush and squaw apple in high vigor to provide winter food for deer.		Increase ground cover of basin wildrye, Idaho fescue, squirreltail, Sandberg bluegrass, and bluebunch wheatgrass from 2-10 to 15% on deep soils; on shallow soils, from 1 to 5%.
5515 Mule Creek	Increase forage production to 471 AUMs to satisfy Class I; leave old grass for spring turnout.	Maintain browse production at present levels.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, basin wildrye, and squirreltail from 5 to 12-15% on deep soils; increase on shallow soils from 2 to 5-8%.
5516 Birch Creek	Increase density of Idaho fescue, needlegrass, and bluebunch wheatgrass.	Maintain as deer summer range and elk winter range.		Increase ground cover of perennial grasses from 15 to 25%.
5517-5523 Otis Mtn. - Hart	Increase forage from 200 to 218 AUMs in Hart and maintain 1738 AUMs in Otis Mtn.; maintain or improve range condition.	Increase livestock type forage for wildlife from 55 to 110 AUMs. Maintain brush cover.		Provide forage for watershed protection.
5518-5520-5521 Newell Field-Little Upson-Rocky Basin	Provide 646 AUMs forage in the 3 allotments.	Provide forage and habitat for 45 deer during the winter.	Reduce SSFs within 10 years.	

5522 Cottonwood Cr.	Provide carryover forage for spring turnout; increase use to 95% of allotment.			Increase ground cover of bluebunch wheatgrass, Idaho fescue, squirreltail, and Sandberg bluegrass from 6 to 15% on deep soils; increase from 1-4 to 10% on shallow soils.
5524 Tub Springs	Maintain 489 AUMs of forage; provide carryover forage for spring turnout.	Maintain present amount of bitterbrush for deer.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, basin wildrye, squirreltail, Sandberg bluegrass, and needlegrass from 10 to 15%; increase vigor from fair to high.
5525 Mill Gulch	Provide 400 AUMs of forage.	Provide forage and habitat for 40 deer within crucial winter range.	Reduce SSFs from 41 and 47 to 28 and 31.	
5526 Chalk Hills	Increase vigor of perennial grasses from low to high.	Maintain big sagebrush and low sagebrush stands in critical deer winter range; butterball hedge bitterbrush.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, crested wheatgrass, squirreltail, and basin wildrye from 1-12 to 15% on deep soils; increase Sandberg bluegrass, squirreltail, bluebunch wheatgrass, and Idaho fescue from 1-4 to 12% on shallow soils.
5527 Drinkwater Summit	Produce 251 AUMs of forage.	Provide forage and habitat for 100 wintering deer by limiting cattle use of bitterbrush to 20% of current annual growth.	Reduce SSF of 45 to 30 in 12 years.	
5528 Cooler	Provide carryover forage for spring turnout; increase from 366 to 667 AUMs.	Maintain low sagebrush and squaw apple in deer winter range.		Increase ground cover of bluebunch wheatgrass, squirreltail, Sandberg bluegrass and needlegrass from 8 to 12-15%; increase vigor from fair to high.
5529 House Butte	Increase forage production by 1,377 AUMs in 5 to 15 years.	Provide forage and habitat for 20 antelope and 240 deer April to November.	Reduce all SSFs to below 40 within 5 years.	Reduce stream reach inventory of Stinking Water Creek from 111 to 75 in 3 years.
5530-5564-5565-5566 River-Wheeler Basin-Upton Mountain-Texaco Basin	Provide 5,857 AUMs of livestock forage; provide forage for 50 wild horses yearlong.	Provide winter forage for 350 antelope and 200 deer; manage for young willows on Malheur River.	Reduce all SSFs to below 35 within 15 years.	Increase ground cover on big sagebrush sites to 60% or more; reverse downward trend of condition within 5 years.
5531 Stinkingwater	Produce 3,288 AUMs of livestock forage; provide forage for 20 wild horses yearlong.	Provide forage for 75 antelope and 200 deer yearlong.	Reduce all SSFs to below 30 within 15 years.	
5532 Mountain	Increase forage production to 3,756 AUMs in 10 years; provide forage for 60 wild horses.	Provide forage and habitat for 20 antelope April to November and 600 deer October to December.	Reduce or maintain all SSFs at or below 35.	
5533 Buchanan	Increase vigor of perennial grasses from moderate to high.	Maintain big sagebrush, low sagebrush, and bitterbrush stands for deer forage.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, Nevada bluegrass, and Sandberg bluegrass from 4-12 to 15% on deep soils, and 6 to 10-12% on shallow soils.
5534 Mahan Creek	Provide carryover forage for spring turnout.	Provide habitat for deer by maintaining big sagebrush, low sagebrush, bitterbrush, and Juniper stands in critical winter range.		Increase ground cover of bluebunch wheatgrass, Idaho fescue, squirreltail, and Sandberg bluegrass from 3-15 to 12-15% on deep soils and 3-12% to 8-12% on shallow soils.

5535 Miller Canyon	Increase forage production by 230 AUMs in 10 years.	Provide winter forage for 300 deer.	Maintain present SSFs.	
5536 Alder Creek	Produce 2,552 AUMs of forage	Provide forage and habitat for 900 deer in critical winter range, 250 deer in summer range and 30 antelope April to November; assure survival of 75% quaking aspen and willow along creeks for fisheries habitat.	Maintain or lower SSFs to Stable class.	
5537 Buck Mountain	Increase forage production from 1,500 to 1,926 AUMs in 10 years	Provide forage and habitat for 40 deer and 300 antelope on their crucial winter ranges.	Maintain present SSFs.	
5538 Riverside	Provide carryover forage for spring turnout; increase forage production from 1,679 to 2,305 AUMs to satisfy Class I.			Increase ground cover of bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, and squirreltail from 3-12 to 12-16% on deep soils.
5541 Wilber FFR	Maintain 100 AUMs of livestock forage.	Increase livestock type forage from 5 to 9 AUMs for big game.		

Appendix B

Methodologies

1. Phase I Watershed Conservation and Development.
2. Erosion Condition.
3. Sediment Yield.
4. Reservoir Impoundment and Evaporation.
5. Determination of Forage Carrying Capacity.
6. Range Condition and Trend.
7. Criteria for Evaluating Stream Conditions.
8. Determination of Forage Allocation for Deer and Antelope.

Appendix B1

Phase I Watershed Conservation and Development

Data on erosion condition and vegetation were gathered in 1975 and 1976 using the Phase I Watershed Conservation and Development Inventory (WC&D) as described in BLM Manual 7322. Information on range trend, sediment yield, and plant species composition were also gathered for each representative area at the same time as the Phase I inventory.

Representative areas were delineated within each allotment by vegetative subtype. Within each representative area a step-point or pace transect of 100 sample points was used, a reading taken at each point, and the type of ground cover (litter, bare ground, large or small rock, or vegetation by species) recorded. Photographs of the transect site, marked by two stakes, were taken. The location, degree and direction of slope, effective root depth, apparent trend, erosion condition class, and sediment yield factor rating were recorded. These data were gathered on 263 representative areas covering 626,961 acres of public land in the ES area.

Appendix B2

Erosion Condition

Present Erosion Condition

Data to determine soil erosion condition were taken during Phase I Watershed Conservation and Development Inventory (WC&D). See Appendix B1 for a description of the Phase I procedure. Each of the 263 Phase I representative areas was evaluated according to the standards outlined on Form 7310-12. The soil surface factor (SSF) rating is based on a 0 to 100 scale. Each criterion listed on Form 7310-12 was alloted points according to erosion conditions. The points were then totaled and an erosion condition class assigned. The following classes are used:

Erosion Condition Class	Points
Stable	0 - 20
Slight	21 - 40
Moderate	41 - 60
Critical	61 - 80
Severe	81 - 100

Future Erosion Condition

The erosion condition classes expected in the future were estimated from Phase I WC&D data. Each representative area was evaluated and an estimate was made of the future erosion condition class for the proposed action. The following considerations were used to predict SSF changes:

1. Site Capability - The capability of each site to produce vegetation.

2. Precipitation - Predicted changes can be reached only under normal precipitation. A series of dry years is expected to slow the increase in vegetative cover.

3. Soils - It will take longer to lower SSFs on sedimentary soils than on volcanic soils.

4. Seedings - Areas seeded with crested wheatgrass will have lower SSFs than areas on native range.

5. Exposure - The vegetative response on north slopes will be greater than that on south slopes.

Form 7310–12
(May 1973)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

By	Date
Location	
Treatment affecting the SSF	

DETERMINATION OF EROSION CONDITION CLASS

SOIL SURFACE FACTORS (SSF)

SOIL MOVEMENT *	No visual evidence of movement 0 1 2 3	Some movement of soil particles 4 5	Moderate movement of soil is visible and recent. Slight terracing generally less than 1" in height. 6 7 8	Occurs with each event. Soil and debris deposited against minor obstructions. 9 10 11	Subsoil exposed over much of area, may have embryonic dunes and wind scoured depressions 12 13 14
SURFACE LITTER *	Accumulating in place 0 1 2 3	May show slight movement 4 5 6	Moderate movement is apparent, deposited against obstacles 7 8	Extreme movement apparent, large and numerous deposits against obstacles 9 10 11	Very little remaining *(use care on low productive sites)* 12 13 14
SURFACE ROCK *	If present, the distribution of fragments show no movement caused by wind or water 0 1 2	If present, coarse fragments have a truncated appearance or spotty distribution caused by wind or water 3 4 5	If present, fragments have a poorly developed distribution pattern caused by wind or water 6 7 8	If present, surface rock or fragments exhibit same movement and accumulation of smaller fragments behind obstacles 9 10 11	If present, surface rock or fragments are dissected by rills and gullies or are already washed away 12 13 14
PEDESTALLING *	No visual evidence of pedestalling 0 1 2 3	Slight pedestalling, in flow patterns 4 5 6	Small rock and plant pedestals occurring in flow patterns 7 8 9	Rocks and plants on pedestals generally evident, plant roots exposed 10 11	Most rocks and plants pedestalled and roots exposed 12 13 14
FLOW PATTERNS *	No visual evidence of flow patterns 0 1 2 3	Deposition of particles may be in evidence 4 5 6	Well defined, small, and few with intermittent deposits 7 8 9	Flow patterns contain silt and sand deposits and alluvial fans 10 11 12	Flow patterns are numerous and readily noticeable. May have large barren fan deposits. 13 14 15
RILLS	No visual evidence of rills 0 1 2 3	Some rills in evidence at infrequent intervals over 10' 4 5 6	Rills ½" to 6" deep occur in exposed places at approximately 10' intervals 7 8 9	Rills ½" to 6" deep occur in exposed area at intervals of 5 to 10' 10 11 12	May be present at 3" to 6" deep at intervals less than 5' 13 14
GULLIES	May be present in stable condition. Vegetation on channel bed and side slopes 0 1 2 3	A few gullies in evidence which show little bed or slope erosion. Some vegetation is present on slopes. 4 5 6	Gullies are well developed with active erosion along less than 10% of their length. Some vegetation may be present. 7 8 9	Gullies are numerous and well developed with active erosion along 10 to 50% of their lengths or a few well developed gullies with active erosion along more than 50% of their length 10 11 12	Sharply incised gullies cover most of the area and over 50% are actively eroding 13 14 15

SITUATION	TOTAL				

Erosion Condition Classes: Stable 0–20; Slight 21–40; Moderate 41–60; Critical 61–80; Severe 81–100

(Instructions on reverse)

EXAMPLES

ITEM	EXAMPLE ONE			EXAMPLE TWO**			EXAMPLE THREE***		
	POTENTIALLY PRESENT	IDENTIFIED FACTORS	POSSIBLE FACTOR	POTENTIALLY PRESENT	IDENTIFIED FACTORS	POSSIBLE FACTOR	POTENTIALLY PRESENT	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Yes	8	14	Yes	8	14	Yes	8	14
Surface Litter	Yes	9	14	Yes	9	14	Yes	9	14
Surface Rock	Yes	7	14	No	–	– –	No	–	– –
Pedestalling	Yes	10	14	Yes	10	14	Yes	10	14
Rills	Yes	8	14	Yes	8	14	No	–	– –
Flow Patterns	Yes	10	15	Yes	10	15	Yes	10	15
Gullies	Yes	6	15	No	–	– –	No	–	– –
TOTAL		58	100		45	71		37	57
Total SSF	$\frac{58}{100} \times 100 = 58$			$\frac{45}{71} \times 100 = 63$			$\frac{37}{57} \times 100 = 65$		

GENERAL INSTRUCTIONS

District prepares one (1) copy and files in district with particular study under consideration.

Do *not* include items in computations which are not potentially present.

Identify numerical factor that most nearly describes the conditions observed by circling the factor given for each logical item.

**Wind and water are considered eroding agents when evaluating item*
***A soil with no rocks in its profile and no probability of gullying*
****A pumice soil area where no water erosion occurs*

SPECIFIC INSTRUCTIONS

Total all factors at bottom of page. Divide total identified factors by total possible factors for items considered and multiply by 100 in order to compute the SSF.

Situation – Describe situations being evaluated such as present, geologic, with mechanical treatment in effect for 10 years, under a 5 pasture livestock management system for last 8 years, etc.

Total – Total computed SSF.

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Appendix B3

Sediment Yield

Data to determine sediment yield were taken during Phase I Watershed Conservation and Development Inventory (WC&D). See Appendix B1 for a description of the Phase I procedure. Each of the 263 Phase I representative areas was evaluated according to the standards outlined on Form 7310-16. Each factor listed on Form 7310-16 was allotted points according to erosion conditions and the points totaled. Conversion of the numerical rating to sediment yield is made using the graph on the back of Form 7310-16.

Future Sediment Yield

In estimating future sediment yield, it was assumed that the only factor to be changed by the proposed action would be ground cover. For each representative area sampled during Phase I inventory, the factor values for each column except ground cover on Form 7310-16 were kept constant, and the following projections for ground cover were made: a rating of 8 for stiff sagebrush sites (20 percent ground cover); a rating of 0 for low sagebrush sites (40 percent ground cover); and a rating of -5 for big sagebrush sites (60 percent ground cover). These ground cover percentages for the different vegetative types were recommended in the Drewsey MFP. The following example shows the difference between the original and the recalculated sediment yield. Representative area 311-042507 had an original ground cover value of 5, with a total factor rating of 25. With a future assumed value of 0 (low sagebrush site) the total rating drops to 20, for a change from 0.2 ac-ft/mi^2/yr to 0.17 ac-ft/mi^2/yr, using the graph on the back of Form 7310-16.

Future Sediment Yield from Construction of Range Improvements

In estimating sediment yield from construction activities, average values as found in the ES area were assumed for all columns on Form 7310-16 except ground cover and land use. For the 32,782 acres proposed for seeding, values of 5 for ground cover (from litter left on the ground) and 10 for land use (all the acres disturbed in construction) were assumed; for the 399 acres covered by the other range improvements, a value of 10 was assumed for both ground cover and land use due to the removal of ground cover during construction. Using these assumptions, the sediment yield rises to 0.6 ac-ft/mi^2/yr on 399 acres, and to 0.5 ac-ft/mi^2/yr on 32,782 acres, for a total increase of 6.1 percent.

$$399 \text{ ac} \times \frac{1 \text{ mi}^2}{640 \text{ ac}} \times 0.232 \text{ ac-ft} = 0.145 \text{ ac-ft}$$

$$399 \text{ ac} \times \frac{1 \text{ mi}^2}{640 \text{ ac}} \times 0.6 \text{ ac-ft} = 0.374 \text{ ac-ft}$$

0.145 ac-ft + 0.374 ac-ft = 0.229 ac-ft increase in sediment yield

$$32{,}782 \text{ ac} \times \frac{1 \text{ mi}^2}{640 \text{ ac}} \times 0.232 \text{ ac-ft} = 11.883 \text{ ac-ft}$$

$$32{,}782 \text{ ac} \times \frac{1 \text{ mi}^2}{640 \text{ ac}} \times 0.5 \text{ ac-ft} = 25.611 \text{ ac-ft}$$

11.883 ac-ft + 25.611 ac-ft = 13.728 ac-ft increase in sediment yield

0.229 ac-ft + 13.728 ac-ft = 13.957 ac-ft or a 6.14 percent increase over the present sediment yield of 227.4 ac-ft/yr.

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SEDIMENT YIELD FACTOR RATING

SURFACE GEOLOGY (a)	SOILS (b)	CLIMATE (c)	RUNOFF (d)	TOPOGRAPHY (e)
(10) a. Marine shales and related mudstones and siltstones	(10) a. Fine textured; easily dispersed; saline-alkaline; high shrink-swell characteristics b. Single grain silts and fine sands	(10) a. Storms of several days' duration with short periods of intense rainfall b. Frequent intense convective storms c. Freeze-thaw occurrence	(10) a. High peak flows per unit area b. Large volume of flow per unit area	(20) a. Steep upland slopes (in excess of 30%) b. High relief; little or no floodplain development
(5) a. Rocks of medium hardness b. Moderately weathered c. Moderately fractured	(5) a. Medium textured soil b. Occasional rock fragments c. Caliche layers	(5) a. Storms of moderate duration and intensity b. Infrequent convective storms	(5) a. Moderate peak flows per unit area b. Moderate volume of flow per unit area	(10) a. Moderate upland slopes (less than 20%) b. Moderate fan or floodplain development
(0) a. Massive, hard formations	(0) a. High percentage of rock fragments b. Aggregated clays c. High in organic matter	(0) a. Humid climate with rainfall of low intensity b. Precipitation in form of snow c. Arid climate, low intensity storms d. Arid climate; rare convective storms	(0) a. Low peak flows per unit area b. Low volume of runoff per unit area c. Rare runoff events	(0) a. Gentle upland slopes (less than 5%) b. Extensive alluvial plains
Factor value				

GROUND COVER (f)	LAND USE (g)	UPLAND EROSION (h)	CHANNEL EROSION AND SEDIMENT TRANSPORT (i)
(10) Ground cover does not exceed 20% a. Vegetation sparse; little or no litter b. No rock in surface soil	(10) a. More than 50% cultivated b. Almost all of area intensively grazed c. All of area recently burned	(25) a. More than 50% of the area characterized by rill and gully or landslide erosion	(25) a. Eroding banks continuously or at frequent intervals with large depths and long flow duration b. Active headcuts and degradation in tributary channels
(0) Cover not exceeding 40% a. Noticeable litter b. If trees present understory not well developed	(0) a. Less than 25% cultivated b. 50% or less recently logged c. Less than 50% intensively grazed d. Ordinary road and other construction	(10) a. About 25% of the area characterized by rill and gully or landslide erosion b. Wind erosion with deposition in stream channels	(10) a. Moderate flow depths, medium flow duration with occasionally eroding banks or bed
(–10) a. Area completely protected by vegetation, rock fragments, litter b. Little opportunity for rainfall to reach erodible material	(–10) a. No cultivation b. No recent logging c. Low intensity grazing	(0) a. No apparent signs of erosion	(0) a. Wide shallow channels with flat gradients and short flow duration b. Channels in massive rock, large boulders, or well vegetated c. Artificially controlled channels
Factor value			

Subtotal (a) – (g)	Subtotal (h) – (i)	TOTAL RATING – – – = – – . – ac.ft./sq. mi./yr.

(Instructions on reverse)

Form 7310–16 (July 1971)

GENERAL INSTRUCTIONS

District Office prepares one copy for District file.

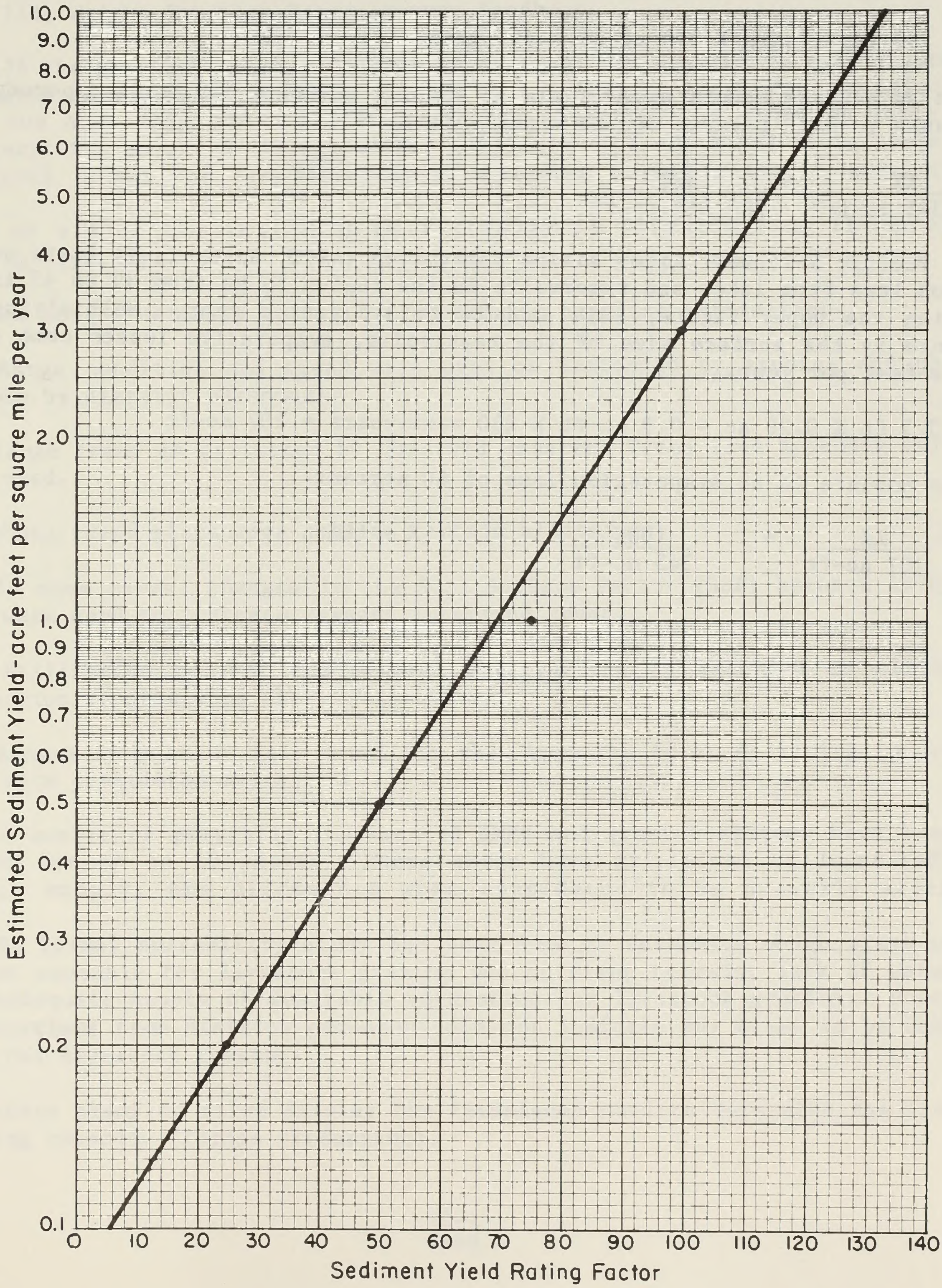
SPECIFIC INSTRUCTIONS

(Items not listed are self-explanatory)

Numbers indicate values assigned appropriate characteristics. Letters a, b, c, and d refer to independent characteristics to which full value may be assigned.

Interpolation between the sediment yield levels may be made. High values for columns (a) through (g) should correspond to high values for (h) and (i). If they do not, factors (a) through (g) should be reevaluated. If they do not correspond, then a special erosion condition exists.

Convert *Total Rating* to sediment yield by use of graph.



Appendix B4

Reservoir Impoundment and Evaporation

The reservoirs to be constructed under the proposed action would, on the average, range from 1.0 to 2.0 acre-feet of volume, with an average surface size of 0.26 acres. The total water impounded would thus equal:

230 reservoirs X 1.5 ac-ft = 345 ac-ft.

With an average annual water yield of 204,944 ac-ft, a 345 ac-ft impoundment amounts to 0.17 percent of the annual yield.

$$\frac{X\%}{345 \text{ ac-ft}} = \frac{100\%}{204{,}944 \text{ ac-ft}} \qquad X = 0.17\%$$

The Pacific Northwest River Basins Commission (1970, Appendix V) lists evaporation loss from lakes and reservoirs in the region to be from 39 to 42 inches. Taking the upper figure, this amounts to 3.5 feet a year. Multiplying this figure by the surface size of the reservoirs, evaporative losses come to 207 acre-feet per year.

3.5 ft X 0.26 ac = 0.9 ac-ft X 230 reservoirs = 207 ac-ft

This amounts to an evaporation loss of 60 percent.

$$\frac{X\%}{207 \text{ ac-ft}} = \frac{100\%}{345 \text{ ac-ft}} \qquad X = 60\%$$

Appendix B5

Determination of Forage Carrying Capacity

Present Forage Carrying Capacity

A series of range surveys was done on each portion of the ES area between the years 1956 and 1967. These surveys were conducted according to BLM Manual 4412.11B, Weight Estimate Forage Survey Handbook.

By 1976 the grazing capacity (forage production) had changed on many allotments. Estimates were made of the new capacity by the Area Manager, who was associated with the area from 1960 to 1976. Grazing capacities as shown on Table 1-2 represent the amount of forage (AUMs) available on a sustained yield basis for livestock under the proposed system, assuming normal climatic conditions.

Some or all of the following were considered in estimating the present grazing capacity.

1. The weight estimate surveys were used for baseline information.

2. Range condition and trend were used as indicated by studies and observations by district personnel.

3. Range trend as estimated by Observed Apparent Trend (see Appendix B6) was also used.

4. Photo trend plots were used on certain allotments.

5. In some cases, changes in the Soil Surface Factor (SSF) between 1970 and 1976 were used to indicate changes in ground cover.

6. Utilization records and general observations as recorded in allotment inspection reports were used.

7. Ranges in poor or fair condition that appeared to be declining in condition were considered overstocked.

8. A number of partially implemented AMPs and grazing systems have been in effect for up to 10 years. Where these have maintained or increased the forage supply, the allotments were considered to be properly stocked.

9. No formal suitability study has been done to determine which areas would not be unusable for livestock grazing due to steep terrain, lack of water or an inadequate supply of desirable vegetation for livestock grazing. However, observations from district personnel did not indicate any areas to be unsuitable for livestock grazing.

The three examples below display the techniques used to determine the present grazing capacity (forage production).

The Coal Mine Creek Allotment, 5514, shows the procedure used to determine the present grazing capacity in an allotment where a reduction in livestock use is proposed. The allotment contains 4,577 acres of public land and has been grazed using a continuous use system for many years. Prior to 1976, grazing use averaged 466 AUMs (9.8 ac/AUM).

Studies completed in 1976 indicated that 79 percent of the allotment (3,596 acres) was in poor condition and 21 percent (981 acres) was in good condition. The area in poor condition also had a severe erosion problem due to farming practices on adjacent areas and excessive grazing use.

The present grazing capacity was determined by comparing the allotment with nearby allotments having similar resources and management conditions.

These comparisons indicate that the 981 acres in good condition should produce approximately 140 AUMs (981 ac - 7 ac/AUM). On the remaining 3,596 acres in poor condition, approximately 153 AUMs should be produced (3,596 ac - 23.5 ac/AUM). As a result, the grazing capacity would be 293 AUMs (140 AUMs and 153 AUMs). Therefore, a reduction of livestock use from 466 AUMs to 293 AUMs is proposed.

The Big Bird Allotment, 5302, is an example of the procedure used to determine the grazing capacity of an allotment where no change in the amount of grazing is proposed.

The Big Bird Allotment consists of 2,567 acres of public land and has been grazed by cattle under a two-pasture rest rotation system since 1967. Most of the allotment has been seeded with crested wheatgrass. The average livestock use for the past several years has been 418 AUMs (6.1 ac/AUM). The 1976 rangeland studies indicated that the entire allotment was in good condition, trend was up and erosion condition was stable. However, observations indicated that heavy utilization occurred during dry years and that two gullies were being revegetated more slowly than expected. As a result of these considerations, no change in livestock grazing use is proposed.

The Square Butte Allotment, 5304, is an example of the procedure used where an increase in grazing is proposed.

The Square Butte Allotment contains 5,001 acres of public land and has been grazed under a two-pasture rest rotation system for several years. Most of the allotment has been sprayed and seeded in the past. Although the grazing preference in the allotment is 625 AUMs, an average of 833 AUMs have been grazed by livestock due to temporary increases authorized in the past.

Studies conducted in 1976 showed that the entire allotment was in good range condition, trend was up and erosion either slight or light. These studies indicate that 833 AUMs can be used by livestock without causing soil or vegetation deterioration. As a result, an increase in livestock use from 625 AUMs to 833 AUMs is proposed.

Future Forage Grazing Capacity

Future forage grazing capacity (forage production) was arrived at by comparisons to adjacent areas with similar range condition, soils or vegetation. These predictions were based on the following assumptions:

1. Completion of the proposed range improvements within 4 years.

2. Full implementation of all AMPs.

3. Supervision of AMPs including trespass control.

4. Normal climatic conditions.

5. Achievement of the projected change in range condition.

The following example displays the use of comparison area data for predicting future forage production.

At present the forage production is 293 AUMs on the 4,577 acres within the Coal Mine Allotment. This production translates to a forage production rate of 15.6 acres per animal unit month (4,577 acres ÷ 29.3 AUMs = 15.6 ac/AUM). At present 981 acres are in good condition and the remaining 3,596 acres are in poor condition. The allotment has been grazed yearly from May 1 to Aug 31 using a continuous grazing system.

The proposed action for this allotment includes the following components:

1. Reduce livestock grazing use 43 percent from 412 AUMs to 236 AUMs.

2. Implement a deferred rotation grazing system.

3. Seed 1,000 acres with crested wheatgrass and yellow sweetclover.

4. Construct eight reservoirs and develop six springs.

The proposed action is designed to increase the forage production by: (1) increasing the composition of the desirable forage species using the livestock grazing reduction, the deferred rotation grazing system and the 1,000 acres of seeding; and (2) spreading the proposed livestock grazing use more evenly using the additional eight reservoirs and six springs.

Based on present livestock grazing use (under a deferred rotation system) of similar seedings in good condition on nearby areas, it is expected that the 1,000 acre seeding could be grazed at a rate of 5 ac/AUM.

A similar comparison indicates native ranges in fair condition and upward trend can be grazed at an average rate of 12 ac/AUM and ranges in good condition at a average rate of 7 ac/AUM.

Using these criteria the 1,000 acre seeding would produce 200 AUMs of forage (1,000 ac ÷ 5 ac/AUM = 200 AUMs). The 2,596 acres expected to be in fair condition would produce 216 AUMs (2,596 ac ÷ 12 ac/AUM = 216 AUMs) and the remaining 981 acres of native range in good condition would produce 140 AUMs (981 ac ÷ 7 ac/AUM = 140 AUMs). The construction of the reservoirs would improve livestock grazing utilization and would allow use of an additional 10 AUMs in areas presently unused or very lightly used.

The combined affect of the livestock reduction and grazing system (356 AUMs) the seeding (200 AUMs), and the development of new water sources (10 AUMs) would increase the forage production rate from 15.6 ac/AUM to 8.1 ac/AUM and produce the projected forage production (566 AUMs) shown on Table 1-2.

Appendix B6

Range Condition and Trend

Range condition is used to describe the quality of the vegetation for livestock forage. Range condition was obtained by determining the vegetative species composition using the Phase I WC&D procedure (See Appendix B1) and plotting the percentage of desirable and intermediate plant species present against the erosion condition class as measured by the soil surface factor (SSF). This procedure was described in BLM Instruction Memorandum No. 75-52 and 75-52 Change 1. According to the instruction memorandum, the following categories are used in determining range condition:

1. Good Condition: Plant composition is 40 percent or more of desirable or intermediate plants with at least 20 percent made up of desirable species. Erosion condition class is stable to slight.

2. Fair Condition: Plant composition is 15 to 39 percent of desirable and intermediate species with at least 5 percent made up of desirable species <u>or</u> 60 percent or more intermediate species. Erosion condition class is less than critical.

3. Poor Condition: Plant composition is less than 15 percent desirable and intermediate species <u>or</u> erosion condition class is critical to severe.

Erosion condition classes are described in Appendix B2. The following criteria were used in determining the plant species desirability:

1. <u>Desirable plants</u> are those which are palatable, productive, and nutritious forage species, are often dominant under climax or near climax conditions, are long-lived and have extensive root systems to aid in watershed erosion protection. Key species include crested wheatgrass, bluebunch wheatgrass, needlegrass, Idaho fescue, basin wildrye, bitterbrush, aspen, and willow.

2. <u>Intermediate plants</u> are of secondary importance in the climax community. They replace the desirables as condition deteriorates and replace the least desirable plants as condition improves. They may be less palatable to grazing animals or be more resistant to grazing use. Key species include low sagebrush, stiff sagebrush, greasewood, Sandberg bluegrass, and squirreltail.

3. <u>Least desirable plants</u> include the poorer species in an ecosystem and consist principally of annuals, invaders, noxious, and low-value forage plants. Examples include big sagebrush, juniper, cheatgrass, and rabbitbrush.

The attached graph was used in plotting the percent of desirable and intermediate plant species against the SSF.

Range trend is a determination of whether range condition is improving, remaining static, or deteriorating. Trend was determined through use of the Observed Apparent Trend form (attached) which weights the vigor of desirable plants, presence of seedlings of desirable plants, the amount of plant pedestaling and litter present, and the condition of the gullies.

Future Range Condition

Future range condition was estimated by predicting the percent of desirable and intermediate plant species that would be present 20 years after full AMP implementation and plotting this percentage against the predicted future soil surface factor (SSF) on the range condition graph. Future erosion condition and SSFs are discussed in Appendix B2 and Chapter 3, Section 3.2.1.

The following assumptions and criteria were used in predicting an increase in the percent of desirable and intermediate plant species:

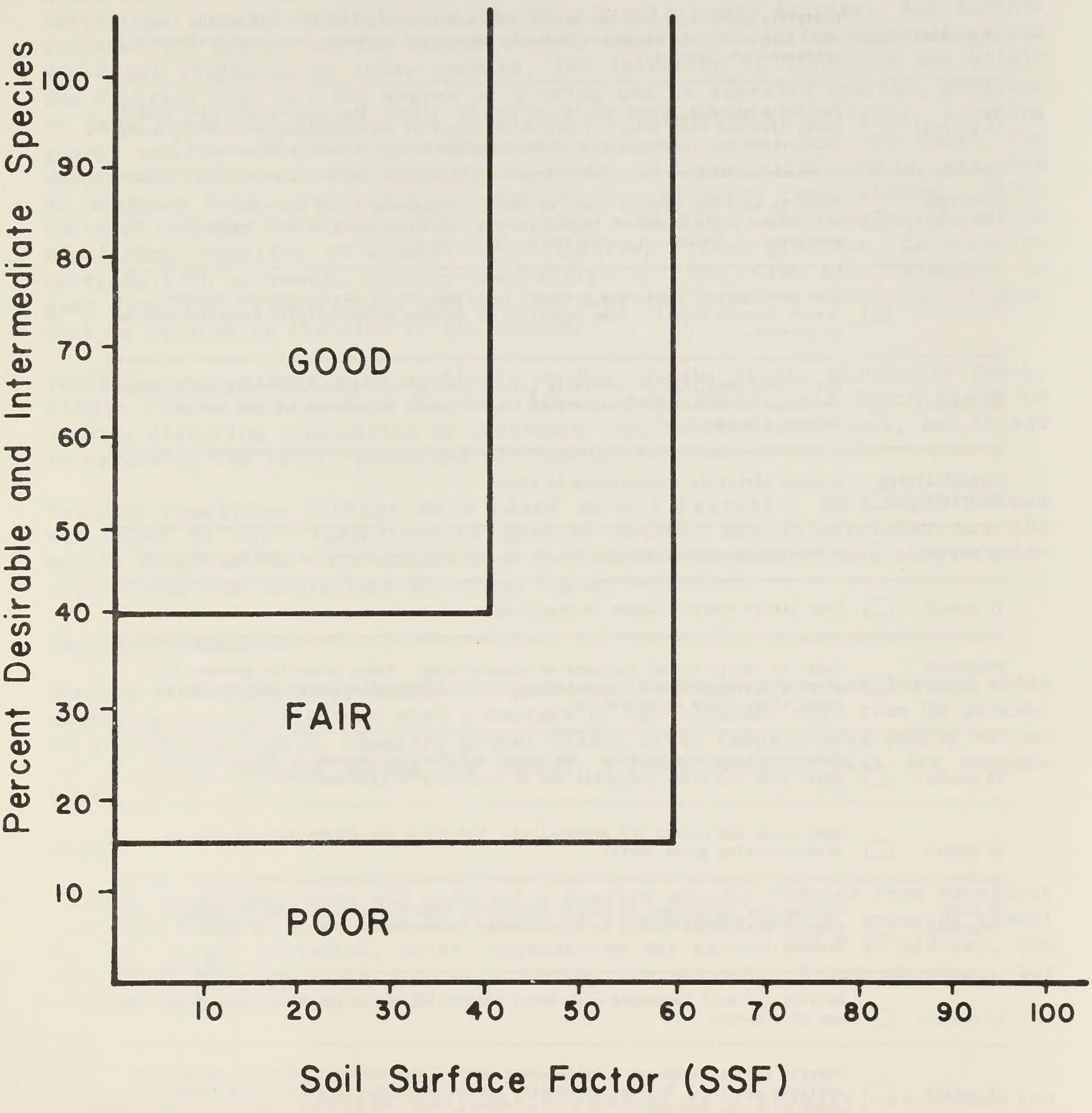
1. The proposed reduction in grazing use by livestock would allow individual desirable grass plants to increase in vigor and basal area.

2. Basin wildrye, Idaho fescue, and bluebunch wheatgrass do not reseed well, while needlegrass and squirreltail do reseed easily.

3. Desirable and intermediate plant species would not increase much on areas heavily dominated by big sagebrush or Sandberg bluegrass.

4. Areas to be seeded with crested wheatgrass would go to good condition.

RANGE CONDITION GRAPH



Range Site Symbol ______________________ Date ______________

Condition Class Symbol ______________________ Examiner ______________

Legal Description ______________________________________

OBSERVED APPARENT TREND

(Check appropriate box in each category which best fits area being observed)

VIGOR (10 points)	[ ]	Desirable grasses, forbs and shrubs are vigorous showing good health. These plants should have good size, color and produce abundant herbage.
(6 points)	[ ]	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color and producing moderate amounts of herbage, some seed stalks and seedheads are present.
(2 points)	[ ]	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seedheads almost non-existent except in protected areas.
SEEDLINGS (10 points)	[ ]	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
(6 points)	[ ]	Some seedlings of desirable grasses, forbs and shrubs may be present in open spaces between plants. Some seedlings of invader or undesirable plant species may be present.
(2 Points)	[ ]	Few if any seedlings of desirable grasses, forbs and shrubs are being established Seedlings of invader or undesirable plants should be present in open spaces between plants.
SURFACE LITTER (5 points)	[ ]	Surface litter is accumulating in place.
(3 points)	[ ]	Moderate movement of surface litter is apparent and deposited against obstacles.
(1 point)	[ ]	Very little surface litter is remaining.
PEDESTALS (5 points)	[ ]	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
(3 points)	[ ]	Moderate plant pedestalling. No visual evidence of healing or deteriorating. Small rock and plant pedestals may be occurring in flow patterns.
(1 point)	[ ]	Most rocks and plants are pedestalled. Pedestals are sharpsided and eroding, often exposing grass roots.
GULLIES (5 points)	[ ]	Gullies may be present in stable conditions with moderate sloping or rounded sides. Perennials should be establishing themselves on bottom and sides of channel.
(3 points)	[ ]	Gullies are well developed with small amounts of active erosion. Some vegetation may be present.
(1 point)	[ ]	Sharply incised V-shaped gullies cover most of the area with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants with fresh cutting of the bottom.

Total Points ______________ Rating: 26-35 = Upward; 17-25 = Static; 7-16 = Downward

General Comments:

Appendix B7

Criteria for Evaluating Stream Conditions

Stream fisheries habitat condition ratings were obtained by having an experienced biologist walk streams and survey their physical and biological characteristics. Habitat condition ratings were based on many factors. Key factors included the percent of the stream shaded, vegetation species composition and vigor and abundance of these species, the intensity of livestock use within the riparian zone and the degree of grazing use on riparian species, presence of dead trees and shrubs, the stability of streambanks, gullying, spawning gravel quality and quantity, sedimentation of pools, pool size and depth, the amount of riffle and the composition of it, the pool:riffle ratio, presence of instream fish cover and the forms of it, and water temperatures. Other factors included water samples measuring turbidity, the amount of stream meandering, sampling of aquatic invertebrates, stream gradient, barriers to upstream fish movement, species composition of fish, fish size, presence of game fish fry, fingerlings, and adults, and the relative abundance of game fish as related to the size of the stream.

Fenceline comparisons were available on Rattlesnake Creek, Bluebucket Creek, Riddle Creek, Middle Fork Malheur River, Paul Creek, and Smyth Creek to observe differing intensities of livestock use, habitat conditions, and to aid in assessing the biotic potential of riparian habitat.

Habitat condition ratings were based on all factors. No single factor was keyed in on. Indicators of habitat quality are interrelated and the biotic potential of each stream must be considered. Some of the characteristics of the four conditions of stream habiat follow:

Excellent Condition

Shading streambank cover exceeds 50 percent, both understory species and shade providing species vigorous with a mixture of age classes, more than 90 percent of streambanks stable, spawning gravel clean, water temperatures rarely exceed 74° F during mid-day during the summer. Trout abundant with few nongame fish.

Good

Shading streambank cover and understory species usually reduced from Excellent Condition habitat, more than 80 percent of streambanks stable, spawning gravel may have slight siltation, water temperatures may exceed 74° F at mid-day, not more than 10 percent of the days during the summer. Trout abundant, but nongame fish species not abundant.

Fair

Streambank plant species noticeably reduced in diversity, reproduction and productivity from that habitat in good and excellent condition.

Shading streambank cover usually less than 20 percent. Many streambanks are unstable with little vegetative healing of eroded banks. Spawning gravel somewhat silty and showing signs of compaction. Instream cover sparse. Water temperatures commonly exceed 74° F at midday during the summer. Fish species composition has abundant nongame fish such as redside shiners and speckled dace, and fewer trout than nongame species.

Poor

Typical riparian plant species missing or sparse. Shading streambank cover commonly 0 to 10 percent. Most erodible banks unstable with almost no healing by vegetation. Spawning gravel marginal with most gravel too silty for spawning and considerable gravel cementation from silt. Many pools have up to half their depth silted in. Water temperatures often exceed 78° F at midday during the summer. Instream cover generally lacking. Algae mats are the primary instream escape cover for trout. Fish species composition predominantly nongame fish.

Appendix B8

Forage Allocation for Deer and Antelope

Forage was allocated based on numbers of animals, season of use, percent Federal range, overlap of diet with livestock, condition of range, and conversion factors to compute AUMs from deer unit months and pronghorn antelope unit months. Conversion of deer and antelope use to AUMs was as follows:

4 deer unit months = 1 AUM
5 antelope unit months = 1 AUM

This conversion takes into account the fact that deer and antelope eat considerably less quantities of forage than a cow and calf. Season of use and optimum numbers of deer and antelope for each allotment was obtained from the Oregon Department of Fish and Wildlife (ODFW) and is available at the Burns District Office. Initial allocation for deer is about half of the projected allocation since deer numbers are presently at about half of ODFW goal population. Only competitive AUMs were allocated to big game. These are based on the dietary overlap between big game and cattle (Yoakum 1967, Kufeld 1973). Competitive AUMs are forage composed of palatable shrubs, grasses and forbs eaten by both livestock and wildlife. Noncompetitive AUMs are comprised of sagebrush, juniper, and forbs not normally eaten by livestock. The dietary overlap and percent competitiveness was calculated at 18 percent for deer and 9 percent for antelope. Some adjustments of competitive AUMs were made depending on range condition for big game in each allotment as based on visual observation by district personnel. A higher rate of dietary overlap was used in allotments with heavily hedged browse where competition appeared higher than average. Two examples of how the above forage allocation works are outlined below:

Forage Allocation for Deer - Allotment 5525

Optimum population of wintering deer (Nov-Apr) is 40 animals (ODFW)

Deer Unit Months: (40 deer) X (6 months) = 240 Deer Unit Months

AUMs: (240 Deer Unit months) X $\frac{\text{(1 AUM)}}{\text{(4 Deer Unit Months)}}$ = 60 AUMs

AUMs on Public Land: (60 AUMs) X (67% Public Land) = 40 AUMs

Competitive AUMs: (40 AUMs) X (18% Dietary Overlap) = 7 AUMs

Projected Allocation (Table 1-2): 7 AUMs

Initial Allocation (Table 1-2): (7 AUMs) X (.5) = 4 AUMs

Note: Initial allocation is one half projected allocation because deer are presently at about half of ODFW goal numbers.

Forage Allocation for Pronghorn Antelope - Allotment 5537

Optimum population of wintering pronghorn antelope (Nov-Mar) is 300 animals (ODFW)

Pronghorn Unit Months: (300 Pronghorn) X (5 months) = 1,500 Pronghorn Unit Months

AUMs: (1,500 Pronghorn Unit Months) X $\frac{\text{(1 AUM)}}{\text{(5 Pronghorn Unit Months)}}$ = 300 AUMs

AUMs on Public Land: (300 AUMs) X (85% Public Land) = 255 AUMs

Competitive AUMs: (255 AUMs) X (10% Dietary Overlap) = 25 AUMs

Projected Allocation (Table 1-2): 25 AUMs

Initial Allocation (Table 1-2): (25 AUMs) X (.95) = 24 AUMs

Note: Initial allocation is 95 percent of projected allocation because antelope are presently at 95 percent of ODFW goal numbers.

Appendix C

AMP Monitoring Procedures

The following procedures are used to monitor the effect of grazing within each AMP. When needed, the data will provide a sound basis for making changes in grazing management.

During the design stage of each AMP, representative areas (key areas) were selected to serve as sites for evaluation studies. Generally, each pasture contains at least one key area. One or more important plants were selected for study within each key area. These species are responsive to grazing, are well adapted to the area, and, when properly managed, will help achieve AMP objectives. Each AMP identifies and describes the key species relative to the particular allotment.

Trend is the change in vegetation and soil characteristics directly resulting from environmental factors, primarily precipitation and grazing. Permanent trend plots would be established in key areas, in accordance with BLM Manual 4412.22C. General and overhead photos taken once during each grazing cycle would be used to observe changes in ground cover, plant vigor, and species composition. The BLM Manual provides that the trend plots be "read" at or near the end of the grazing use period.

The key forage plant method of measuring utilization will be used to monitor grazing intensity and to help determine (along with range condition and trend) whether adjustments in stocking are needed. The key forage plant method is a visual estimate of the degree to which selected forage plants (key species) have been grazed or browsed. Five utilization classes are used to designate relative degree of use. (BLM Manual 4412.22B7c describes these methods in detail.) BLM personnel would measure average utilization of the suitable range in the "graze pasture" near the end of each grazing period.

Following the grazing season each permittee is required to submit a record showing the number of livestock and the dates their livestock used each pasture. In addition, BLM personnel make periodic checks in each allotment to assure that the correct stocking levels are maintained. Each AMP would be evaluated at the conclusion of each grazing cycle using various study procedures to monitor changes in plant composition and ground cover. Decisions affecting future stocking levels or changes in the grazing system will consider the trend in range condition along with stocking rates in relation to the estimated carrying capacity, climatic conditions, and results of utilization studies.

Appendix D

Soil Mapping Unit Acreages

Mapping Unit	Acres	Mapping Unit	Acres	Mapping Unit	Acres
1	28,168	60/2	5,600	77-75/3-5	24,095
1-10	14,084	60/3	15,102	77-75/4-5	2,206
1-15	2,630	60/3-4	3,903	77-75-79/4-5	19,005
1-43	6,618	60/4	15,356	77-76/2-3	339
3	255	60/5-3	2,375	77-76/6	13,405
10	2,885	60/5-6	17,647	77-83/5	2,715
10-1-15	2,800	60/6	679	77-84/3	848
10-11	5,599	60-56/3	1,527	77-84/3-5	16,290
10-15	18,835	60-56-82	1,697	79/3-2	848
10-43	1,273	60-75/5-6	16,290	79-75/4-5	3,224
11-12-14	1,188	60-76/2-3	848	79-77-99/2	1,018
12-46-43	20,023	60-76/3	5,939	82-83/2-3	2,206
13	17,308	60-83/3-5	16,968	82-83/5-4	1,018
13-45	6,448	60-98/3-6	2,375	83/2-3	2,375
14-43-13	8,654	60-98/5-6	7,805	83/5-6	8,993
15	2,715	75/2-3	58,710	83/6	5,769
26	22 483	75/4-5	2,121	83-75/5-6	5,430
30	2,884	75/5-6	8,993	83-76-82/5-6	5,939
30-31	424	75-51/2-3	1,697	83-82/5-6	3,394
31	2,715	75-60/4	12,047	83-82-96/5-6	41,742
42	29,525	75-75L/4-5	13,067	83-84/2-3	6,787
42-13	4,751	75-77/4-5	12,047	83-84/4-5	83,145
43	19,938	75-77/5-6	20,786	83-84-79/1-2	3,394
43-10	3,139	75-82-96/5-6	7,636	83-84-82/3-5	21,211
43-13	2,375	75-96/5-6	11,878	83-84-96/3-5	8,314
44	47,002	75-99/2-3	48,190	83-84-96/4	1,527
44-13	3,903	75L-99/2-3	2,885	83-84-96/5-6	4,412
44-26	8,314	76/2-3	42,845	83-96/6	764
44-43	18,665	76/4-5	6,363	84/4	2,375
45-43	1,188	76/5-6	28,846	84-77/3-2	18,157
47-13	12,557	76-75/2-3	8,145	84-83/2-3	30,374
51	3,988	76-75/5-6	6,618	84-83/4-5	37,840
51/2-3	1,188	76-76L/2-3	5,430	84-83/5	1,697
51-6	20,362	76-76L/4-5	679	84-83-79/2-3	7,466
51-43	4,242	76-S76/2-3	2,545	96	3,309
51-95	2,036	76-77/4-5	14,593	96/5-6	4,581
55/2	10,351	76-83/5-6	13,235	96/6	11,369
55/2-3	2,545	76-83-96/4-5	10,775	96-60/5	2,206
55/3	5,515	76-96/5-6	24,010	98-79/5-4	1,357
56/2	1,782	S76/2-3	5,599	99	11,538
56/3	1,188	S76-96/2-3	5,939	Ash	5,090
56/3-5	2,121	S76-96/5-6	18,495		
56-6/3-5	3,394	S76-99/2-3	9,333	Total	1,344,235
56-60/5-3	2,121	77/2-3	12,726	(Public and Private Land Acres)	
57	170	77-60/3-5	509		

Appendix D

Soil Units shown on Figure 2-2 General Soils Map

Soil Divisions on Figure 2-2	Soil Units
Alluvial	1, 3, 6, 10, 11, 12, 13, 14, 15, 95
Basin terraces and lakebeds	26, 30, 31, 42, 43, 44, 46, 47
Older terraces	51, 55, 56, 57
Lacustrine	69, 98
Volcanics	75, 75L, 76, 76L, 77, 79
Stony volcanics	S76, 96, 99
Upland volcanics	82, 83, 84

Appendix D

Properties and Qualities of the Soils in the Drewsey ES Area

Soil Unit	Classification Subgroup- -Family[1/]	Slope Gradient (percent)	Landscape Position	Bedrock or Underlying Material	Texture Surface / Subsurface	Drainage Class	Depth to Bedrock (inches)	Available Water Holding Capacity (inches)	Permeability	Soil Reaction (pH)
1	Xerollic Camborthids- -Coarse-silty, mixed, mesic	0 - 7	Floodplains	Alluvium	SiL / SiL	Good	60+	9 - 12	M	6.6 - 8.4
3	Xerollic Camborthids- -Coarse-loamy, mixed, mesic	0 - 3	Floodplains	Alluvium	VFSL / SiL	Good	60+	3 - 9	M. Rapid	7.4 - 7.8
6	Xeric Torriorthents- -Coarse-loamy, mixed, non-calcareous, frigid	0 - 7	Floodplains	Alluvium	FSL / FSL	S. Exc	60+	6 - 9	Rapid	6.6 - 7.3
10	Cumulic Haplaquolls- -Fine-silty, mixed, calcareous, mesic	0 - 3	Floodplains	Alluvium	SiL / SiL	S. Poor	60+	9 - 12	M	7.4 - 7.8
11	Histic Haplaquolls- -Fine- silty, mixed, non-calcareous, mesic	0 - 3	Floodplains	Alluvium	SiL / SiL	Poor	30 - 40	6 - 9	M. Slow	6.1 - 7.3
12	Histic Haplaquolls- -Fine, montmorillonitic, non-calcareous, mesic	0 - 3	Floodplains	Alluvium	SiC / SiC	V. Poor	20 - 40	6 - 9	Slow	7.4 - 7.8
13	Fluventic Haplaquolls- -Fine-silty, mixed, calcareous, mesic	0 - 3	Floodplains	Alluvium	SiL / SiL	S. Poor	20 - 40	6.- 9	M	7.4 - 9.0
14	Fluventic Haplaquolls- -Fine, mixed, non-calcareous, mesic	0 - 3	Floodplains	Alluvium	SiL / SiC	Poor	60	9 - 12	Slow	6.6 - 7.3
15	Cumulic Haplaquolls- -Fine-silty, mixed, noncalcareous, mesic	0 - 3	Floodplains	Alluvium	SiL / SiCL	Poor	60+	9 - 12	M	7.4 - 8.4
26	Xerollic Camborthids- -Loamy, mixed, frigid, shallow	0 - 3	Basin terrace	Lacustrine Sed.	SiL / SiL	Good	15 - 20	3 - 6	M	6.6 - 7.3
30	Typic Pelloxererts- -Montmorillonitic, frigid	0 - 3	Basin terraces and lakebeds	Alluvium	C / C	Poor	60+	6 - 9	V. Slow	6.6 - 7.8
31	Xerertic Torriorthents- -Fine, montmorillonitic, noncalcareous, frigid	0 - 3	Basin terraces and lakebeds	Alluvium	SiC / SiCL	S. Poor	60+	6 - 9	V. Slow	6.6 - 7.8

Appendix D (Continued)

Properties and Qualities of the Soils in the Drewsey ES Area

Soil Unit	Classification Subgroup- -Family 1/	Slope Gradient (percent)	Landscape Position	Bedrock or Underlying Material	Texture Surface / Subsurface	Drainage Class	Depth to Bedrock (inches)	Available Water Holding Capacity (inches)	Permea-bility	Soil Reaction (pH)
42	Typic Natraquolls- -Fine, montmorillonitic, calcareous, mesic	0 - 3	Basin terraces and lakebeds	Lacustrine Sed.	SiL / SiL	S. Poor	60+	6 - 9	V. Slow	8.5 - 10.0
43	Fluventic Haplaquepts- -Coarse-silty, mixed, caleous, mesic	0 - 3	Basin terraces and lakebeds	Lacustrine Sed.	SiL / SiL	S. Poor	60+	6 - 9	M. Slow	8.5 - 10.0
44	Xerollic Natrargids- -Fine-silty, mixed, mesic	0 - 3	Basin terraces and lakebeds	Alluvium	SL / L	Mod. Good	60+	6 - 9	M. Slow	8.5 - 9.0
46	Typic Haplaquolls- -Fine-silty, mixed, calcareous, mesic	0 - 3	Basin terraces and lakebeds	Alluvium	SiL / SiL	S. Poor	60	6 - 9	M. Slow	8.5+
47	Xerollic Natrargids- -Fine-silty, mixed, mesic	0 - 3	Basin terraces and lakebeds	Alluvium	CL / CL	M Good	60	9 - 12	M. Slow	8.5 - 9.0
51	Xerollic Camborthids- -Coarse-loamy, mixed, mesic	0 - 12	Older fans and terraces	Alluvium	LS / L	S. Exc.	60+	6 - 9	M. Rapid	7.4 - 8.4
55	Xerollic Durargids- -Fine-loamy, mixed, mesic	3 - 12	Older fans and terraces	Alluvium	GL / GL	Good	60+	3 - 6	Slow	6.6 - 7.8
56	Xerollic Durargids- -Fine, montmorillonitic, mesic	3 - 35	Older fans and terraces	Alluvium	GL / GCL	Good	60+	3 - 6	Slow	6.6 - 7.8
57	Xerollic Haplagids- -Fine-loamy, mixed, mesic	0 - 7	Older fans and terraces	Alluvium	SL / L	Good	60	9 - 12	M	7.4 - 7.8
60	Calcic Argixerolls- -Fine-loamy, mixed, mesic	3 - 60	Uplands	Lacustrine Sed.	L / CL	Good	60+	6 - 9	M. Slow	6.6 - 7.8
75	Lithic Xerollic Haplargids- -Loamy, mixed, frigid	3 - 60	Uplands	Volcanic	VStSiL / VStSiL	Good	10 - 20	3 - 6	M	7.4 - 8.4
75L	Lithic Xerollic Haplargids- -Loamy, mixed, frigid	3 - 35	Uplands	Volcanic	SiL / L	Good	10 - 20	3 - 6	M	7.4 - 8.4

Appendix D (Continued)

Properties and Qualities of the Soils in the Drewsey ES Area

Soil Unit	Classification Subgroup- -Family[1/]	Slope Gradient (percent)	Landscape Position	Bedrock or Underlying Material	Texture Surface / Subsurface	Drainage Class	Depth to Bedrock (inches)	Available Water Holding Capacity (inches)	Permea-bility	Soil Reaction (pH)
76	Lithic Xerollic Paleargids- -Clayey, montmorillonitic, frigid	3 - 60	Uplands	Volcanic	VStSiL / VStSiCL	Good	10 - 20	3 - 6	Slow	6.6 - 7.8
S76	Lithic Xerollic Paleargids- -Clayey-skeletal, montmorillonitic, frigid	3 - 60	Uplands	Volcanic	ExStL / ExStC	Good	10 - 20	3 - 6	Slow	6.6 - 7.8
76L	Lithic Xerollic Paleargids- -Clayey, montmorillonitic, frigid	3 - 35	Uplands	Volcanic	StSiL / StSiCL	Good	10 - 20	3 - 6	Slow	6.6 - 7.8
77	Lithic Torriorthents- -Loamy, mixed, frigid	3 - 35	Uplands	Volcanic	VStGL / VStGL	Good	5 - 10	0 - 3	M	6.6 - 7.8
79	Xerollic Camborthids- -Fine-loamy, mixed, mesic	3 - 60	Uplands	Volcanic	L / L	Good	60+	9 - 12	M	7.4 - 8.4
82	Pachic Cryoborolls- -Fine-loamy, mixed	3 - 60	Uplands	Volcanic	SiL / SiL	Good	20 - 40	6 - 9	M	6.1 - 7.3
83	Argic Lithic Cryoborolls- -Loamy, mixed	3 - 60	Uplands	Volcanic	VStSiL / StSiCL	Good	10 - 20	3 - 6	M. Slow	6.6 - 7.8
84	Lithic Cryoborolls- -Loamy, mixed	3 - 60	Uplands	Volcanic	VStGL / StGL	Good	5 - 10	0 - 3	M	6.6 - 7.8
95	(Sand Dunes)	0 - 20	Floodplains	Sand	Sand	Exc	60	0 - 3	V. Rapid	-
96	(Steep Rock land)	20 - 60	Uplands	Volcanic	-	Good	0 - 10	Variable	M	6.6 - 7.8
98	(Soft raw sediments, steep)	20 - 60	Uplands	Lacustrine Sed.	-	Good	0 - 10	Variable	M	6.6 - 8.4
99	(Bare lava flows)	3 - 12	Uplands	Volcanic	-	Good	0	0	0	-
Ash		3 - 7	Uplands	Cinders	-	Exc	60	Variable	Rapid	6.6 - 7.3

1/ No series identified

Source: Lovell et al. 1969; Lindsay et al. 1969

C - clay
L - loam
Si - silty
S - sand
G - gravelly
V - very
St - stony
Ex - extremely
F - fine

S - somewhat
Exc - excessive

M - moderate
V - very

Appendix E

Scientific Names of Plants Mentioned in the ES

alder	Alnus spp.
aster	Aster spp.
balsamroot	Balsamorhiza sagittata
baltic rush	Juncus balticus
basin wildrye	Elymus cinereus
big sagebrush	Artemisia tridentata
bighead clover	Trifolium macrocephalum
biscuitroot	Lomatium spp.
bitterbrush	Purshia tridentata
bluebunch wheatgrass	Agropyron spicatum
buckwheat	Eriogonum spp.
cheatgrass	Bromus tectorum
chokecherry	Prunus virginiana
crested wheatgrass	Agropyron cristatum
Douglas-fir	Pseudotsuga menziesii
foxtail	Hordeum spp.
greasewood	Sarcobatus vermiculatus
Idaho fescue	Festuca idahoensis
juniper	Juniperus occidentalis
Kentucky bluegrass	Poa pratensis
low sagebrush	Artemisia arbuscula
lupine	Lupinus spp.
mat muhly	Muhlenbergia richardsonis
mountain mahogany	Cercocarpus ledifolius
Nebraska sedge	Carex nebraskensis
needlegrass	Stipa spp.
onion	Allium spp.
peppergrass	Lepidium spp.
phlox	Phlox spp.
ponderosa pine	Pinus ponderosa
pondweed	Potamogeton spp.
quaking aspen	Populus tremuloides
rabbitbrush	Chrysothamnus spp.
saltgrass	Distichlis spp.
Sandberg bluegrass	Poa secunda
sedge	Carex spp.
smartweed	Polygonum spp.
smooth brome	Bromus inermis
squaw apple	Peraphyllum ramosissimum
squirreltail	Sitanion hystrix
stiff sagebrush	Artemisia rigida
willow	Salix spp.
yarrow	Achillea millefolium
yellow sweetclover	Melilotus officinalis

Appendix F

Prehistoric Sites

Land Status
Private- - - - -P
BLM - - - - - - - B

Quality Evaluation
High- - - - - - -13-15A
Medium- --- - -10-12B
Low- - - -less than 10C

Oregon Archeological Survey (OAS) Number

35 (Oregon) - HA (Harney County) - 64 (Site Number)

	OAS Number	Site Attributes	Land Status	Quality Evaluations1/
1.	35-HA-64	Surface Site and Basalt Quarry	P	9/C
2.	35-HA-65	Village Site with House Depressions	P	7/C
3.	35-HA-66	Surface Site	B	7/C
4.	35-HA-67	Surface Site	B	6/C
5.	35-HA-68	Village Site	B	9/C
6.	35-HA-69	Surface Site	B	9/C
7.	35-HA-70	Surface Site	B	7/C
8.	35-HA-71	Campsite	B	6/C
9.	35-HA-72	Campsite	B	6/C
10.	35-HA-73	Campsite	B	6/C
11.	35-HA-74	Campsite and Manufacturing Site	B	6/C
12.	35-HA-75	Campsite and Manufacturing Site	B	6/C
13.	35-HA-76	Campsite	P	8/C
14.	35-HA-379	Pictograph Site	P	10/B
15.	35-HA-25	Altithermal Spring Site	P	8/C
16.	35-HA-5	Campsite	B	not available
17.	35-HA-12	Seed-exploitation Site	B	not available
18.	35-HA-31	no data	P	not available
19.	35-HA-33	Small Rockshelter	unknown	not available
20.	35-HA-34	unknown	unknown	not available
21.	35-HA-35	no data	P	not available
22.	35-HA-358	Campsite	B	not available
23.	35-HA-377	Campsite	B	not available
24.	35-HA-378	Campsite; poor condition	B	not available
25.	35-HA-22	no data	P	not available

1/ Quality ratings are based upon archaeological significance, condition of the site as compared to similar features, documentation available, uniqueness, and ability to arouse curiosity. BLM Manual 6111, Quality Evaluation of Recreation Use Opportunities, describes methodology for completing quality evaluations.

Appendix G

Discussion of Impacts on Vegetation for Selected Allotments

The impacts on certain allotments as shown on Table 3-5 (Summary of Impacts to Vegetation) are different than normally expected from the proposed action. The following is a discussion of these apparent contradictions.

(1) Prather Creek Allotment 5102

Although this allotment has a continuous use system and no reduction in livestock grazing is shown, actual livestock use has been reduced due to elimination of unauthorized grazing use. In addition, stocking rate (21 ac/AUM) would result in light to moderate utilization of the desirable species. Consequently, the forage is expected to increase as shown on Table 3-5.

(2) Beckly Home Allotment 5211

This allotment is proposed for a continuous use system with grazing occurring yearly from June 16 to October 15. This system has been in effect for a number of years and the trend is upward. Since most of the use (80 percent) in this allotment would occur after the desirable species have matured, this form of grazing should have an impact similar to deferred grazing system. Consequently, a long-term increase in (1) composition of desirable herbaceous species, (2) forage production, and (3) vegetative ground cover is expected as shown on Table 3-5.

(3) Princeton Allotment 5301

A deferred rotation grazing system is proposed for this allotment. The long-term forage production shown is somewhat greater than would normally be expected from this type of system. However, a livestock water pipeline is proposed which would allow livestock use on several seeded areas. Since these areas are presently lightly or unused now, the additional water would allow increased forage use without a related increase in desirable species. Most of the forage production increase shown on Table 3-5 is the result of the additional water development.

(4) Crows Nest Allotment 3505.

This entire allotment has been seeded. The seedings are all considered successful and in the past have been grazed at the projected forage production level (1,000 AUMs). The entire area has an upward trend, therefore it is assumed the future forage production will be available on a sustained basis.

(5) Burnt Flat Allotment 5313

This allotment has had heavy wild horse use in the recent past. Since then, most of the horses have been removed. The increased forage production shown on Table 3-5 reflects the forage available after the wild horse removal.

(6) Summit Springs Allotment 5314

A significant portion of this allotment is poorly watered for livestock. Development of additional water will allow livestock access to forage that was previously unused. This action will provide the additional forage shown on Table 3-5.

(7) Hart Allotment 5523

This allotment is listed as having continuous grazing system with a 1-month season of use from April 16 to May 16 yearly. Because of the allotment's high elevation, this season of use is equivalent to the early grazing system on lower elevation allotments. Therefore, the impacts to vegetation displayed are similar to impacts of the early grazing system.

(8) Mountain Allotment 5532

This allotment has had very heavy horse use in the recent past. Since then approximately 220 wild horses have been removed. The increased forage production shown on Table 3-5 reflects the removal of wild horses.

Glossary

G

GLOSSARY

Acre-foot - The volume of water that will cover 1 acre to a depth of 1 foot.

Actual Use - That portion of the authorized grazing permit which is used annually. In this document actual use is the same as 1976 authorized use.

Algal Blooms - Proliferation of living algae on the surface of lakes, streams, or ponds.

Allocation - In reference to forage, the distribution of the available forage production to the various resource needs such as wildlife, livestock, wild horses, and watershed.

Allotment - An area of land where one or more operators graze their livestock. Generally consists of public land but may include parcels of private or state lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of one or several pastures.

Allotment Management Plan (AMP) - An intensive livestock grazing management plan dealing with a specific unit of rangeland, based on multiple-use resource management objectives. The AMP considers livestock grazing in relation to the renewable resources - - watershed, vegetation, and wildlife. An AMP establishes the season of use, the number of livestock to be permitted on the range, and the range improvements needed.

Alluvial - Pertaining to material that is transported and deposited by running water.

Altithermal - Belonging to a time about 7,500 to 4,500 years ago during which the climate is relatively warm and arid - often associated with post-glacial time.

Angler Day - Any visit for the purpose of fishing during one day as defined by the Oregon Department of Fish and Wildlife.

Animal Unit Month (AUM) - The amount of forage required to sustain the equivalent of one cow with one calf, or their equivalent for one month.

Annual Vegetative Growth - The amount of forage or herbage produced during one growing season.

Archeological Resources - All physical evidence of past human activity other than historical documents, which can be used to reconstruct lifeways and cultural history of past peoples. These include sites, artifacts, environmental data and all other relevant information.

Background - That area from 3-5 miles to 15 miles from the viewer.

Benefit-Cost Ratio - This ratio is a comparison of all benefits and all costs of a given action or profits derived. A B/C ratio of 2:1 means that two dollars worth of benefits would be realized for each dollar invested.

Browse - That part of leaf and twig growth of shrubs, woody vines and trees available for animal consumption.

Carrying Capacity - The maximum stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates such things as the suitability of the range to grazing as well as the proper use which can be made on each and all the plants within the area. Normally expressed in terms of acres per animal unit month (ac/AUM) or sometimes referred to as the total AUMs that are available in any given area such as an allotment. Areas that are unsuitable for livestock use are not computed in the carrying capacity. This may or may not be the same as the stocking rate.

Coliform - A group of bacteria used as an indicator of sanitary quality in water.

Concentration Area - An area where factors such as terrain, water, vegetation, fences, or management practices result in livestock congregation. Generally, these areas are grazed more heavily than surrounding areas.

Contrast Rating - A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

Convection - A mechanically or thermally produced upward or downward movement of a limited part of the atmosphere that is essential to the formation of many clouds.

Critical Growing Period - The portion of a plant′s growing season generally between flowering and seed dissemination, when food reserves are being stored and seeds produced. Grazing after the start of this date is detrimental due to inadequate moisture for supporting further later in the season.

Critical Habitat - A relatively small part of an animal′s range or habitat which is essential for the animal′s existence because it contains special qualities or features (e.g., water holes, winter food and cover, nesting trees, strutting ground, upland meadow).

Cultural Resources - A term that includes resources of paleontologic, archeologic, or historic significance which are fragile, limited, and nonrenewable portions of the human environment.

Desert Culture Traditon - A regional model of prehistory emphasizing a general, widespread adaptation to an arid environment. Subsistence was based on intensive exploitation of many resources. Plant gathering and seasonal migration through many ecological zones characterized the pattern.

Desirable Plants - Those plants which are palatable and productive forage species and often are dominant under climax or near climax conditions. They are normally long-lived plants which can include grasses, forbs, and browse. These plants are to be maintained or increased by intensive livestock grazing management.

Diatomaceous Earth - A light-weight, porous sedimentary material composed principally of the shells of minute aquatic organisms known as diatoms.

Direct Earnings - Earnings generated at primary stage of production. For example: ranch earnings from livestock production would be direct while earnings for such things as transporting, marketing, and slaughtering livestock would be indirect.

Dissolved Oxygen Saturation - The amount of gaseous oxygen (0) dissolved in a liquid - usually water.

Dissolved Solids - The total amount of dissolved material, organic and inorganic, contained in water or wastes.

Distance Zones - The area that can be seen as foreground, middleground, background or seldom seen.

Ecological Condition - A measure of a plant community compared to the original or pristine community. Excellent condition is when 75 percent or more of the vegetation is of the same kind as that in the original stand; good condition is when the percentage is between 50 and 75; fair condition is when the percentage is between 25 and 50; and poor condition is when less than 25 percent of the plants are of the same kind as that in the original community.

Erosion - Detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Exclosure - An area fenced to exclude livestock and wild horses.

Fault Block Mountain - A block or mountain that has been raised along a fracture in the earth (fault) with a corresponding drop of the valley along the fault.

Food Reserves - Carbohydrates stored in plant parts and used to maintain the dormant plant and begin growth the following season.

Forage Production - The amount of forage that is produced within a designated period of time on a given area. (expressed in AUMS or pounds per acre).

Forb - Any non-grass like herbaceous plant.

Foreground - That area from 0 miles to 0.5-1 miles.

Grazing Cycle - The number of years required to complete the sequence of grazing in specified pastures in a certain order. For example, it is the completion of one full cycle of yearly schedules back to the point of beginning.

Groundwater - Subsurface water that is in the zone of saturation.

Gully - A channel, usually with steep sides, through which water commonly flows during and immediately after rains or snow melt.

Hardpan - A hardened soil layer, usually between 10 to 20 inches beneath the surface, caused by cementation of soil particles.

Herb - A seed-producing plant that does not develop persistent woody tissue.

Herbage - Herbaceous plant growth, especially fleshy, edible plants.

Herbaceous Plants - Plants having little or no woody tissue.

Infiltration - The gradual downward flow of water from the surface through soil to groundwater.

Intermittent Stream - A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long-continued supply from melting snow or other sources. It is dry for a large part of the year, ordinarily more than 3 months.

Inversion - The state of the atmosphere in which a layer of cold air is trapped near the earth's surface by an overlaying layer of warm air; may cause serious air pollution problems.

Key Forage Species - A plant that is a relatively or potentially abundant species. It should be able to endure moderately close grazing and serve as an indicator of changes occurring in the vegetational complex. The key species is an important vegetative component that, if overused, will have a significant effect on watershed conditions, grazing capacity, or other resource values. More than one key species may be selected on an allotment. For example, a species may be important for watershed protection and a different species may be important for livestock forage or wildlife forage, etc.

Lacustrine Sediments - Material deposited in lake water and later exposed by lowering of the water level or by the elevation of the land.

Limiting Factor - A component of the environment which regulates animal populations (e.g., food, water, cover).

Litter - A surface layer of loose, organic debris, consisting of freshly fallen or slightly decomposed organic materials.

Management Framework Plan (MFP) - Land use plan for public lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Middleground - That area between the foreground and 3 to 5 miles from the viewer.

National Register of Historic Places - Established by the Historic Preservation Act of 1966, the Register is a listing maintained by the National Park Service of architectural, historical, archeological, and cultural sites of local, state or national significance. Sites are nominated to the Register by the States and by Federal agencies.

Nonpoint Pollution - Pollution whose sources cannot be pinpointed; can best be controlled by proper soil, water, and land management practices.

Outstanding Natural Areas - Areas of outstanding scenic splendor, natural wonder, or scientific importance that merit preservation in their natural condition. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas and public use facilities are normally located on the periphery of the area. The public is encouraged to walk into the area for recreation purposes wherever feasible.

Planning Area Analysis (PAA) - A planning document which analyzes the relationship of social and economic data to the physical and biological data presented in a Unit Resource Analysis (URA).

Palatability - The relish with which a particular plant species or part is consumed by an animal. The palatability of a plant is usually related to its ecological significance as far as succession is concerned. That is, highly palatable plants are usually those which are desirable species and decrease with increasing grazing pressure. Conversely, low palatability usually characterizes a species which is least desirable and increases with increasing grazing pressure.

Paleontology - A science dealing with the life of past geological periods as known from fossil remains.

Pasture - A subdivision of a grazing allotment.

Perennial Stream - A stream or portion of a stream that flows year long. It receives water from precipitation, springs, melting snow, and/or groundwater.

Persistent Ground Cover - That portion of total vegetative ground cover that is produced by herbaceous perennial plants.

pH - The negative logarithm of the hydrogen ion concentration. A low pH indicates an acid, and a high pH indicates an alkaline substance. A pH of 7.0 is considered neutral.

Plant Community - An aggregate of plants which forms a distinct ecological unit. Same as a vegetation community.

Plant Composition - The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc.

Plant Maturity - That point in the growing season when an individual plant species has set seed, stored food reserves and gone into the dormant stage. This time is different for various species.

Plant Vigor - The state of health of a plant. The capacity of a plant to respond to growing conditions, to make and store food, produce seed, or reproduce vegetatively by rhizones or stolons.

Potential Plant Community - A unique group of plants that in the absence of abnormal disturbances is best suited to the prevailing climate and soil condition of an area.

Preference - Grazing privileges established on the basis of use of the Federal range during the priority period following the passage of the Taylor Grazing Act. AUMs preference are attached to a livestock operator´s private base lands.

Public Land - Formal name for lands administered by the Bureau of Land Management.

Range Condition - In this case, should be referred to as grazing condition. Grazing condition is based on the percent of desirable forage in the composition for livestock and the existing erosion condition of a site. Condition of the range must include consideration of vegetation quality and quantity and soil erosion characteristics.

Range Improvement - A structure, action, or practice that increases forage production, improves watershed and range condition or facilitates management of the range or the livestock grazing on it.

Range Trend - Change in vegetation and soil characteristics resulting directly from environmental factors, primarily climate and grazing.

Research Natural Areas - Areas established and maintained for research and education. The general public may be excluded or restricted where necessary to protect studies or preserve research natural areas. Lands may have: (1) Typical or unusual faunistic or floristic types, associations, or other biotic phenomena, or (2) Characteristic or outstanding geologic, pedologic, or aquatic features or processes.

Residual Ground Cover - That portion of the total vegetative ground cover that remains after the livestock grazing season.

Residual Vegetation - Dried herbaceous vegetation which persists through winter and spring.

Rest - As used in this statement, refers to deferment of grazing on a range area (pasture) to allow plants to replenish their food reserves.

Rill - A small, intermittent water course with steep sides, usually only a few inches deep.

Riparian - Related to wet areas associated with streams, springs, seeps, meadows and reservoirs

Runoff - That portion of the precipitation on a drainage area that is discharged from the area in stream channels, including both surface and subsurface flow.

Scenic Corridor Buffer Zone - Scenic corridors along roads and highways, rivers and streams, trails and other lands for the preservation, protection and enhancement of scenic and natural values.

State Historic Preservation Office (SHPO) - Position established to review Environmental impact statements within every State; also maintains a register of historic sites (including archeological) for the State and advises State land management on archeological matters.

Sustained Yield - The achievement and maintenance in perpetuity of a high level, annual or regular period output of the various renewable resources of land without impairment of the productivity of the land and its environmental values.

Terrace - A level, usually narrow plain bordering a river, lake, or sea.

Thermal Cover - Vegetation or topography that prevents radiational heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

Turbidity - The cloudy condition caused by suspended solids in a liquid.

Unallotted Lands - Public land which currently have no authorized livestock grazing.

Unit Resource Analysis - A BLM planning document which contains a comprehensive inventory and analysis of the physical resources and an analysis of their potential for development, within a specified geographic area.

Utilization - The proportion of the current year's forage production that is consumed or destroyed by grazing animals. This may refer either to a single species or to the whole vegetative complex. Utilization is expressed as a percent by weight, height, or numbers within reach of the grazing animals.

Vegetation Community - An aggregate of plants which forms a distinct ecological unit. Same as plant community.

Vegetative Ground Cover - The percent of the land surface covered by all living and undecomposed remnants of vegetation within 20 feet of the ground.

Visual Contrast - The effect of a striking difference in the form, lie, color, or texture of an area being viewed.

Visual Resource - The land, water, vegetation, animals and other features that are visible on all public lands.

Visual Resource Management (VRM) Classes - The degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogenous area.

Water Yield - The amount of water discharged in streams.

Wilderness Inventory - An evaluation of the public lands in the form of a written description and map showing those lands that meet the wilderness criteria as established under Section 603(a) of FLPMA and Section 2(c) of the Wilderness Act.

Wilderness Review - The term used to cover the entire wilderness inventory, study, and reporting phases of the wilderness program of the Bureau.

Wilderness Study - The process of analyzing and planning wilderness preservation opportunities within the Bureau's Planning System.

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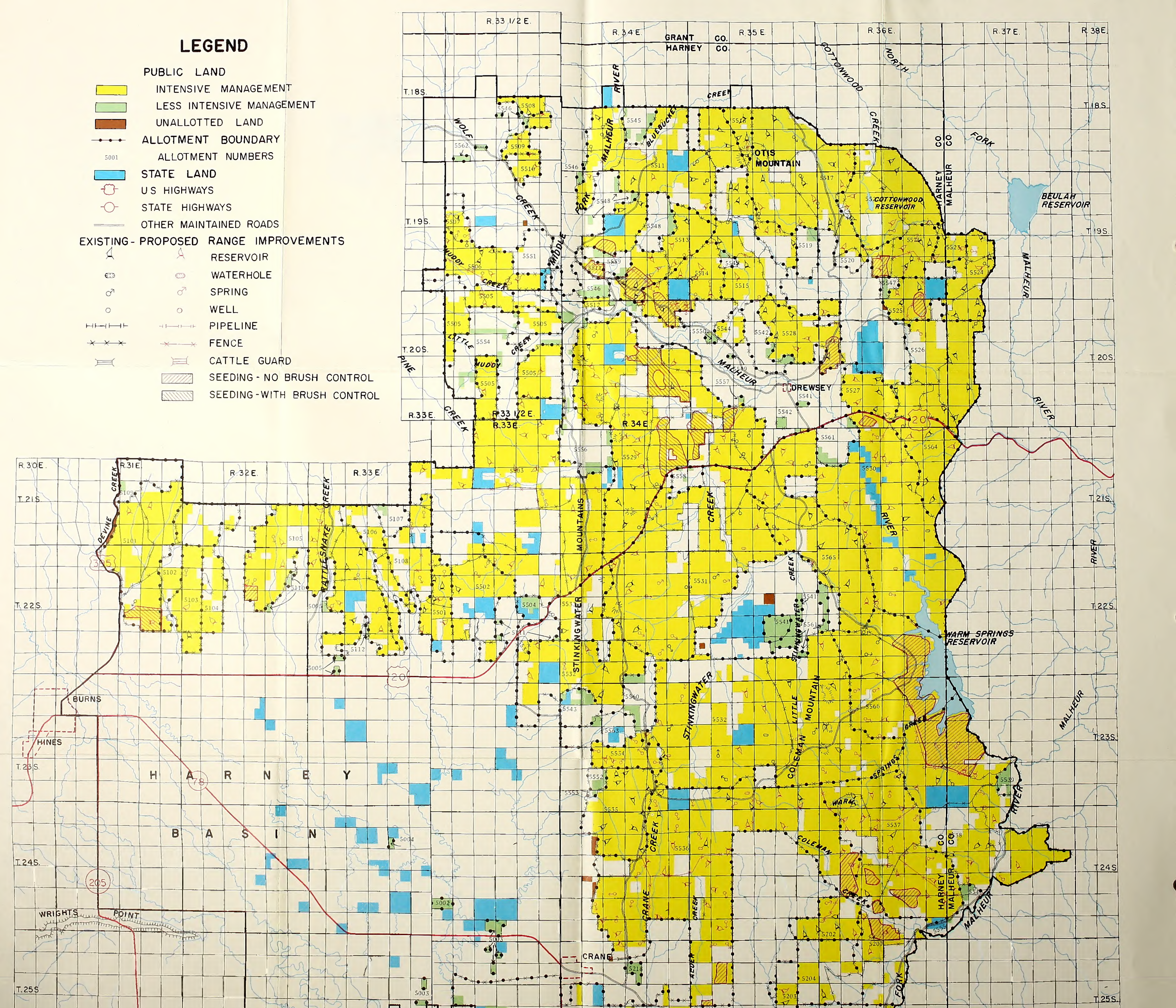
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SEEDING - NO BRUSH CONTROL
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GRANT CO.
HARNEY CO.
OTIS MOUNTAIN
COTTONWOOD RESERVOIR
BEULAH RESERVOIR
DREWSEY
WARM SPRINGS RESERVOIR
STINKINGWATER MOUNTAINS
LITTLE COLEMAN MOUNTAIN
BURNS
HINES
CRANE
WRIGHTS POINT
H A R N E Y
B A S I N
MALHEUR RIVER
NORTH FORK
MIDDLE FORK
WOLF CREEK
BLUEBUCKET CREEK
COTTONWOOD CREEK
MUDDY CREEK
LITTLE MUDDY CREEK
PINE CREEK
DEVINE CREEK
RATTLESNAKE CREEK
STINKINGWATER CREEK
CRANE CREEK
COLEMAN CREEK
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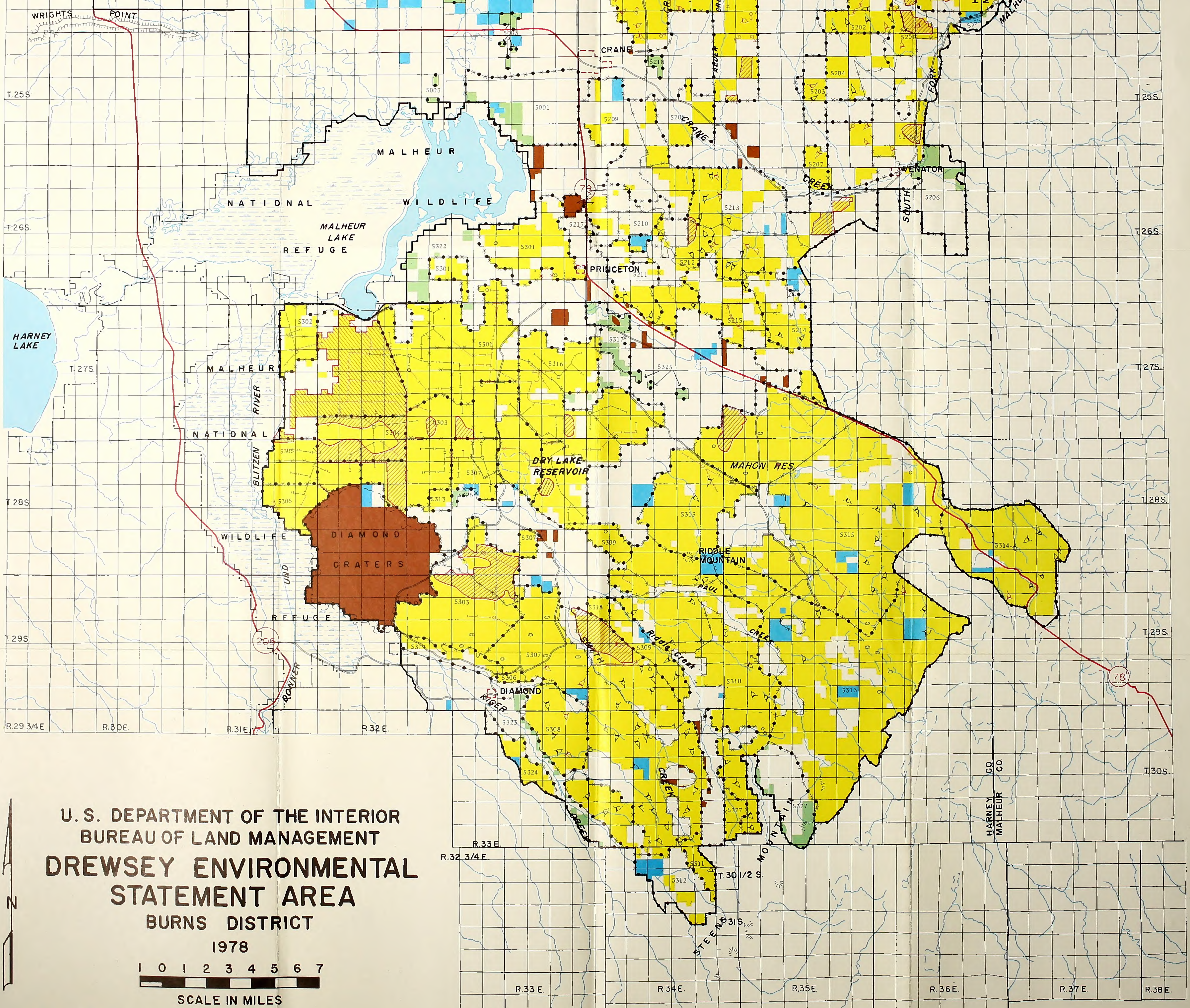

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DREWSEY ENVIRONMENTAL STATEMENT AREA

BURNS DISTRICT

1978

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SCALE IN MILES

FIGURE I-I

☆ U.S. GOVERNMENT PRINTING OFFICE: 1979—697-623